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ADDRESSES AND ORIGINAL ARTICLES

THE PREVENTION OF CANCER*

BY W. CRAMER, D.Sc. Edin., Ph.D. Berlin, M.R.C.S. Eng.

(*From the Imperial Cancer Research Fund*)

THE only method available at present to reduce cancer mortality is the propaganda for early diagnosis. Even at its most successful, the results of such propaganda can only be limited, for reasons which need not be entered into here. I propose to discuss in this paper whether the prevention of cancer is possible and whether it does not offer more far-reaching possibilities.

Spontaneous cancer may be described as an experiment, performed by nature, of which the exact conditions are unknown. The experimental study of cancer has as its object the analysis of these conditions. So far it has succeeded in establishing two main factors as being responsible for the development of malignancy—an intrinsic factor of susceptibility, and an extrinsic factor of chronic irritation, or chronic stimulation, if that term is preferred. The terms "intrinsic" and "extrinsic" are being used as referring to the cell which undergoes a malignant change. In a crude way one might represent these relationships by stating that so far as the induction of malignancy is concerned, susceptibility and chronic stimulation are required in inverse ratio; the more susceptible the tissue the less chronic stimulation is required, and vice versa. In man we have the importance of these two factors strikingly illustrated by two groups of cancer: on the one hand there is occupational cancer, where the disease develops as the direct result of a specific extrinsic factor which does not operate normally, and where the disease appears in only a small proportion of the individuals subjected to the action of the extrinsic factor; on the other hand there are the rare cases of cancer in twins, affecting the same organ in both, and appearing usually at an early age—representing therefore an extreme case where the intrinsic factor of susceptibility preponderates and the extrinsic factor plays an unimportant part. Between these two extremes there lies the great bulk of the incidence of cancer in man, in which the disease develops as the result of a variety of extrinsic factors, the exact nature of which is largely unknown, acting on susceptible individuals.

Susceptibility and Stimulus

It is clear that it is hardly possible to prevent the occurrence of cancer in highly susceptible persons, but it is equally clear, from the evidence of occupational cancer, that it should be possible to prevent the occurrence of those cases of cancer in which the extrinsic factor plays an important part. In occupational cancer the extrinsic factor is known—namely, some particular condition associated with the occupation. Our object must be, therefore, to identify the unknown extrinsic factors which are responsible for the bulk of the incidence of cancer in man. In civilised countries this falls mainly on the stomach, the upper and lower parts of the digestive tract, and in women, also on the breast and uterus. So far it has been a matter of extraordinary difficulty to identify, from a comparison of the habits or conditions of life of those who develop cancer with those who remain free from it, any particular condition or habit as being responsible for the onset of the main bulk of cancer in any of these organs; there appears to be no reason why cancer attacks one individual and spares others exposed to the same external conditions. It is this failure to account for the apparently arbitrary selection of its victims rather than our lack of knowledge concerning the ultimate intracellular change constituting malignancy which gives to the disease the air of a grim mystery.

The explanation for this failure is to be found in the fact that up to now such comparisons have been made by taking into account only the extrinsic factor as the determining condition and neglecting altogether the complicating influence of the intrinsic factor of susceptibility. Even in the study of occupational cancer we find that only a fraction of those who are engaged in a particular occupation develop cancer, and those who do are not necessarily those who have been engaged in the occupation over the longest period. It is known that people have developed cancer who have been engaged in a particular occupation only for five or seven years, and who have then entered an entirely different occupation. After a further interval of ten years or more some of them develop cancer. It was, in fact, this phenomenon that made it so difficult in the past to accept the existence of such a condition as occupational cancer. One naturally asked: How can the occupation be responsible for the causation, if a larger number of persons who have been engaged in the same occupation over a larger number of years do *not* develop the disease? Experimental carcinogenesis has been able to clear up this difficulty by producing the same phenomenon experimentally, and by showing that the complicating factor is the factor of susceptibility. We know now that *a degree of chronic irritation or chronic stimulation which is harmless to one individual produces cancer in a more susceptible one.*

Cancer in Different Countries

We must seek, therefore, for another method of approach. If we restrict our investigations to those individuals who suffer from cancer, we exclude presumably the factor of susceptibility, since ex hypothesi the bulk of those who suffer from cancer must be susceptible to it, although perhaps in a varying degree. If we compare the site incidence of cancer between different groups of population suffering from cancer, between men and women of the same country for instance, or between individuals of the same sex of different countries, we find extraordinary differences. It goes without saying that for such a comparison one must restrict oneself to countries where reliable cancer statistics are available. Such differences are shown very clearly, for example, in Table I., comparing England and Bavaria.

Similar comparisons between England and other countries reveal a bewildering variety in the organ incidence between different populations. If we compare the organ incidence of cancer in England and a number of continental countries, we find that in England cancer attacks most organs of the digestive tract much more frequently that in, say, Holland or Germany. Thus cancer of the tongue—an accessible site where it can be diagnosed with a fair amount of certainty—is much more frequent in England. The only exception is the stomach, which is affected half as frequently in England as in continental countries, where gastric carcinoma

* Paper read at the International Cancer Congress in Madrid, October, 1933.

accounts for half the total mortality from cancer. One would expect, therefore, to find from such a comparison, why cancer of any one particular organ is much more frequent in one group than in another. Actually this is not possible. Thus a comparison between women of different countries shows that the breast and uterus are affected much more frequently in England than in most continental countries, whereas for most other organs the incidence is higher among continental women. The marked difference in the incidence of cancer of breast and uterus suggests at first sight a very suitable material for the identification of the extrinsic factors responsible for the development of malignancy. For here are two organs in which a definite relationship between the incidence of cancer and their functional activity has been demonstrated. Actually such an investigation has been carried out by an international committee of statisticians and pathologists under the auspices of the League of Nations. In spite of a most detailed and exhaustive inquiry it was not found possible to identify any extrinsic factors which could account for the difference.

TABLE I.—*Percentage of Organ Incidence in the Total Cancer Mortality—England and Bavaria.*[1]

[For total mortality in England and Bavaria see Table IV.]

	Bavaria.		England.	
	M.	F.	M.	F.
Stomach	55·8	42·3	22·2	16·6
Intestine	6·9	5·7	12·7	14·3
Rectum	8·3	4·3	10·3	6·0
Liver	6·8	8·0	6·0	7·2
Œsophagus	4·1	4·0	6·4	1·9
Tongue	0·5	0·1	4·6	0·4
Breast	—	9·2	—	19·4
Uterus	—	14·2	—	15·0

M. = males; F. = females.

Total Incidence and its Components

This investigation, in spite of its negative results, is of outstanding importance, because it was demonstrated that wide differences in the organ incidence are not necessarily due to the operation of extrinsic factors. What, then, are they due to? I have so far emphasised the fact that in a comparison of different groups of population the organ incidence may show wide differences. It is surprising to find that when we take the total incidence of cancer of such populations, which is the sum of all these varying organ incidences, the figures closely approach each other. This appears to be a statistical law of cancer, which holds good for those civilised societies where reliable statistics are available. The most striking example is found in a comparison between men and women of the same country, or of different countries (Fig. 1). In women, breast and uterus are responsible for from 20 to 30 per cent. of the total cancer incidence. The corresponding organs in men show only a very low incidence. One would expect to find, therefore, a lower total cancer incidence in men than in women. As a matter of fact, in countries where reliable cancer statistics are available, it is nearly the same. What is the explanation of this remarkable phenomenon?

The fact that the whole populations of countries closely allied racially and living under very similar social, hygienic, and climatic conditions have an approximately equal total cancer incidence, which is composed of organ incidences varying widely from country to country, indicates that these different populations contain about an equal number of susceptible people. The same argument applies to the male and female population of the same country. The organ incidence distributes itself over this susceptible moiety of the population. Thus in women there are three organs, or groups of organs—mamma, uterus, and digestive tract—which being most exposed to chronic irritation, will pick out those individuals in which cancer develops most readily, while in men there is only one group of organs—the digestive tract. This is sufficient to account for the fact that in men the incidence of cancer falls more frequently on the digestive tract.

The way in which the intrinsic factor of susceptibility and extrinsic factor of chronic irritation interact to bring about this phenomenon of an approximately equal total cancer incidence made up of widely varying organ incidences can best be explained by reference to a semi-diagrammatic example. We will compare a standard population of 1,000,000 men of all ages with a standard population of 1,000,000 women of all ages. In these two populations the total cancer incidence, accepting the English cancer statistics and using round figures, will be 1000 persons for each population of 1,000,000 persons. To simplify the argument we will assume that in men only five organs are attacked by cancer which are common to both sexes. We will further assume that these organs, which will be called A, B, C, D, and E, are attacked in the proportions given in the Table. In women there are in addition two other organs, F and G (breast and uterus) which are responsible for 30 per cent. of the total cancer mortality, so that this percentage of susceptible women is thereby removed from the 1000 susceptible women. As a result, fewer susceptible women remain in whom the organs A, B, C, D, and E, common to both sexes, are attacked by cancer, as shown in Table II.

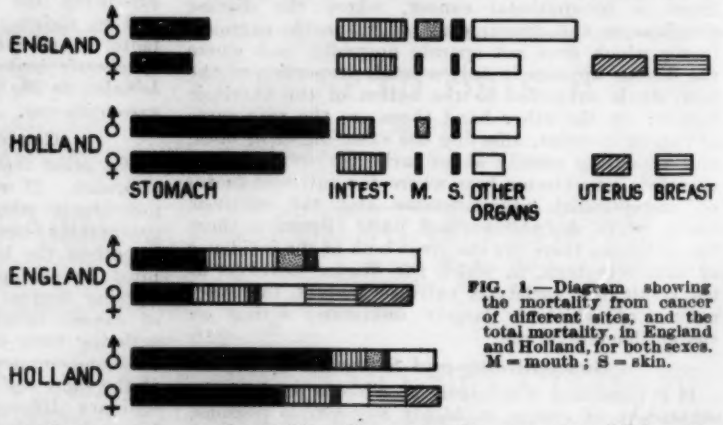

FIG. 1.—Diagram showing the mortality from cancer of different sites, and the total mortality, in England and Holland, for both sexes. M = mouth; S = skin.

Therefore we cannot attribute the higher incidence of cancer of the digestive tract in men to some particular conditions of life, or modes of life to which men subject themselves and from which women are supposed to be free. Similarly, if a comparison is made in the incidence of cancer between the women of different countries, different habits of life may vary the degree of chronic irritation to which one or

more of the different organs will be subjected. If the habits of life in one country are such as to increase the process of chronic irritation in the digestive tract as compared with another country, a larger number of susceptible women will develop cancer of the digestive tract, and therefore fewer susceptible women will remain to develop cancer of the breast

TABLE II

Organs.	Men.	Women.
A	500	300
B	200	150
C	100	100
D	100	100
E	100	50
F	—	150
G	—	150
Total	1000	1000

and uterus. A similar argument applies to a comparison between the male population of different countries. I can perhaps make this point clearer by another diagrammatic example (Table III):—

TABLE III

Organ.	Red.	Green.
A	200	500
B	200	100
C	200	100
D	200	100
E	200	200
Total mortality	1000	1000

We will again simplify the argument by assuming that the total incidence is made up from the incidence in five organs which we will call A, B, C, D, and E. For the persons in Group Red, the incidence is distributed equally over the five organs. If now, in Group Green, Organ A is exposed to more severe chronic irritation than in Group Red, cancer will develop more frequently in Organ A. If we take again our standard population of 1,000,000 people with a total mortality from cancer of 1000 persons per annum, we have in our example a mortality in Group Red of 200 persons for each organ. In Group Green we assume that the mortality from cancer in Organ A rises for the reasons just given to 500 persons per annum. This must necessarily leave fewer susceptible people in Group Green to develop cancer in Organs B, C, D, and E, as shown in the diagram.

The significance of this from the point of view of the ætiology of cancer is this: if we make a comparison of this kind, the higher incidence of Organ A of Group Green has an ætiological significance. It is a *direct* increase due to more severe chronic irritation, and this therefore can be determined by investigation. But no ætiological significance attaches to the higher incidence in the Organs B, C, D, in Group Red as compared with Group Green. This is mainly an *indirect* effect, and an investigation of such a difference cannot reveal an ætiological factor of significance. In the comparison between English women and Dutch women, referred to above, we can now understand why the lower incidence of cancer of the breast and uterus in Holland as compared with England is merely an indirect effect, and that the direct effect is represented by the increase in the incidence of cancer of the stomach and digestive tract, which in both sexes is more exposed to chronic irritation in Holland than in England, so that in Dutch women a larger proportion of the susceptible moiety of the population dies from cancer of the stomach and fewer susceptible individuals are available to develop cancer of the breast and uterus.

Cancer of the Stomach

An investigation directed towards the difference of the incidence of cancer of the stomach should, therefore, yield information on the conditions responsible for the development of malignancy in this organ. In Western Europe, at any rate, the stomach is the organ where an investigation into the extrinsic factor is most likely to yield results. It dominates the total incidence of cancer, for in most countries it is responsible for more than half the total cancer mortality, even in women (Table IV).

TABLE IV.—*Share of Gastric Cancer in the Total Cancer Mortality*

—	Total cancer mortality per 100,000.	Total cancer mortality absolute.	Gastric cancer mortality absolute.	Share of gastric cancer in whole mortality in per-centage.
England and Wales	118	26,013	5774	22·2
		(Liver*	1554	+ 6·0)
		(Œsophagus*	1670	+ 6·4)
United States	97·5	48,848	20,970	42·8
Australia	87·3	3120	1333	42·7
Holland	118	4379	2427	55·5
Bavaria	115	4106	2366	55·8
Switzerland	135	2654	1503	55·8
Norway	123	1679	867	56·6
Sweden	120	3214	1944	60·5
Czechoslovakia	107	3611	2381	66·0

* The incidence for œsophagus and for liver is given for England, because in some countries the national statistics include either liver or œsophagus in the figures for gastric cancer. For further details on the course of the figures in this table see W. Cramer, Zeits. f. Krebsforsch., 1931, xxxiv., 535.

There is only one exception—namely, this country—where the stomach is responsible for only 25 per cent. of the total cancer mortality. If we analyse the mortality of gastric cancer in countries with a high incidence of cancer of the stomach, for different groups arranged according to social status or professions we find groups of populations in which the stomach is responsible for as much as 70 per cent. of the total cancer mortality; that is to say, in such a group for four people who die of cancer, three die of cancer of the stomach (Table V).

TABLE V.—*Share of Organs of Digestive Tract in Total Cancer Mortality in per cent. in different Occupations. Men (Bavaria).*

—	Œso-phagus	Sto-mach.	Intes-tine.	Rec-tum.	Liver.	No. of cases.
1. Agriculture	2·4	*70·6*	4·4	4·6	4·0	1295
2. Workman	3·1	*66·0*	4·8	5·6	5·6	640
3. Artisans	2·7	*66·0*	4·9	7·3	6·2	631
4. Brewers, publicans	5·9	*39·0*	11·4	8·5	12·7	236
5. Low-grade officials	9·0	*34·2*	10·6	9·3	11·6	311
6. Clerks	9·6	*24·2*	12·1	13·8	14·2	240
7. Merchants	6·7	*29·6*	14·3	20·5	9·5	210
8. High-grade officials, free professions	4·6	*37·8*	12·0	18·0	8·3	217
9. Invalids, retired persons	2·9	*60·8*	6·6	11·8	5·8	306

Another interesting fact is that wherever such an analysis has been made, cancer of the stomach is more frequent in the country districts than in the urban population. This seems to exclude the possibility that differences in the accuracy of diagnosis are responsible for these wide variations, and to show that they must be due to differences in habits or conditions of life. The most striking evidence in support of this view I have left to the end. It is an analysis of the incidence of cancer of the stomach in the different social classes in England, and was made

nearly ten years ago by the late Dr. Stevenson[1] at that time chief medical officer to the Registrar-General. He divided the population of England into five social classes, and showed that the incidence of cancer of the upper digestive tract increases rapidly as we descend in the social scale (I. to V. in Fig. 2), while the incidence is almost the same in all social classes for the lower part of the digestive tract.

This argument proves, to my mind conclusively, that the stomach—and the upper part of the alimentary tract—is exposed in certain social classes to conditions which lead to cancer, but which are avoided to a large extent by the upper social classes. In other words, cancer of the stomach—and of the upper part of the alimentary tract—is essentially a disease which can be avoided and prevented, and in which the extrinsic factors responsible for its onset can be determined by studying the habits and conditions of life of those groups of population where it is very prevalent.

It does not seem fanciful to associate the high incidence of cancer of the stomach in the lower social classes with defective alimentary hygiene, using intentionally a vague term. The clinical investigation into the history of patients with gastric cancer from this point of view would be almost certain to yield important information on the habits and conditions which in man lead to cancer of the stomach. In such an investigation it would, of course, be necessary, in view of the long period of induction of malignancy in man, to go back for 15 or 20 years into the history of the patient. A careful study of 36 cases of gastric cancer from this point of view has actually been made recently by an American clinician[2] and has yielded interesting results of just the nature one had expected. Dental disease and lack of an adequate number of teeth for proper mastication were, among the factors investigated, those most frequently found in this group of cases. The frequency of gastro-intestinal diseases in the gastric history of these patients was perhaps to be expected, but this is difficult to interpret, since this group of factors must necessarily include the earlier symptoms of the malignant disease itself. Such factors as heat of ingesta, irregularity of meals, a restricted intake of water, and the use of seasonings appeared less prominently than the state of the mouth, but still with a significant frequency, in the gastric history, while arterio-sclerosis, sinusitis, tonsillitis had no significant place there. It is not difficult to understand why certain factors are incriminated by this investigation, since they are such as to inflict a continual injury on the gastric mucous membrane.

They are, of course, only a few of the possible factors; others are likely to be elicited by further investigation. The point I wish to make is that there is evidence that some of the factors concerned in the ætiology of cancer are of a rather banal nature, which one can avoid, and that there is no reason to regard the problem as an impenetrable mystery. This aspect of the cancer problem seems to me to be one which is now ripe for clinical attack. If it were possible to prevent cancer of the stomach, even in a proportion of persons, a great advance would be made, for the stomach is the organ most frequently affected, and owing to its inaccessibility, the disease there is for practical purposes incurable.

Observations in Sumatra

A very interesting and exceptionally striking example of differences in the site incidence with a similar total mortality from cancer has been observed by Snyders and Straub[3] in Sumatra. My attention has been drawn to this observation by Prof. C. Bonne, of Batavia, and I am greatly indebted to him for this important information. The observation refers to the incidence of cancer among the coolies in East Sumatra. In certain districts the medical service is very efficient, the age constitution of the population is known, the patients are sent to hospital, and the diagnoses are verified by autopsy. The coolies are either native Javanese or Chinese. The two races live under similar social and climatic conditions,

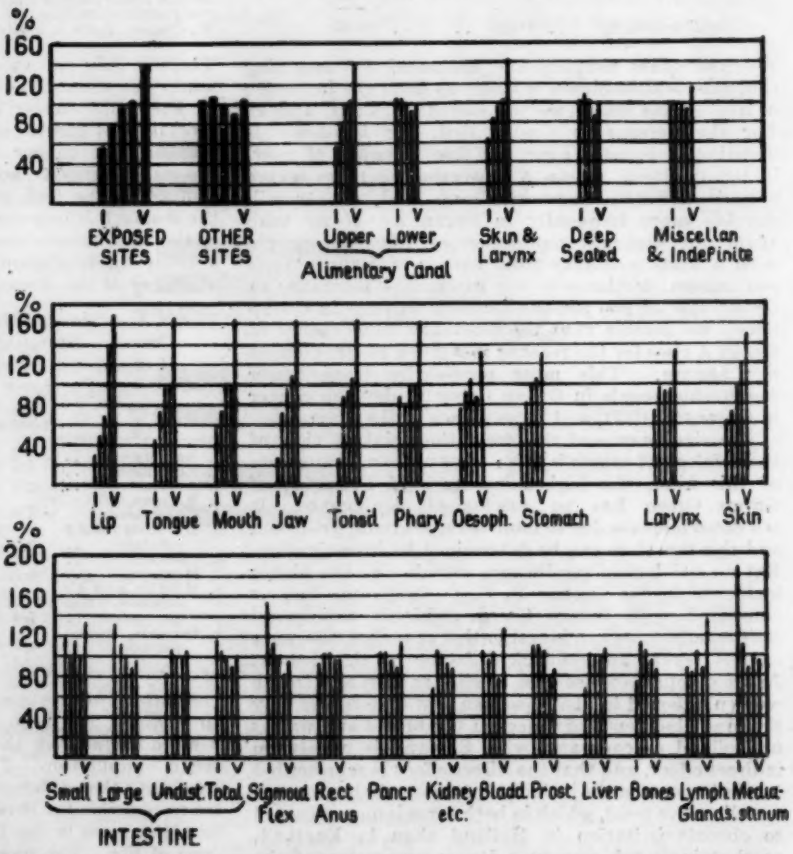

FIG. 2.—Social distribution of mortality from cancer at various sites. Five social groups (I to V), in descending scale, are shown, and the mortality in each of them is expressed as a percentage of the mortality of all occupied and retired males from cancer at the same site. (Copied from the Registrar-General's Decennial Supplement, England and Wales, 1921. Part II.)

but they do not intermarry. It was found that the total mortality from cancer among the coolies is about as high as among a corresponding age-group in Holland, and is not very different for Javanese and Chinese. But the organ incidence shows extraordinary variations. The most frequent form of cancer among the coolies is a primary liver-cell carcinoma (not a bile-duct carcinoma) which is almost always associated with cirrhosis of the liver. As is well known, this form of cancer is extremely rare among Europeans. Next in frequency occurs among the Chinese cancer of the stomach, while in the Javanese cancer of the stomach is very rare. It is interesting to note that gastric ulcer is frequent in the Chinese but rare in the Javanese. The actual figures are as follows :—

—	Total number of cancer cases.	Percentage of—	
		Liver cancer.	Stomach cancer.
Javanese	101	55	1
Chinese	75	28	19

There is here a clear example of the statistical law of cancer referred to above—that in a comparison of the cancer mortality of different populations an increase in the incidence in one particular organ due to a direct effect is associated with a diminished incidence in other sites of such an order that the total incidence for the two populations remains the same. An external factor, which is not operative in Europe, produces primary carcinoma of the liver so frequently that the other organs are less frequently attacked. This explains why cancer of the stomach is less frequent. But it is hardly sufficient to explain the almost complete absence of gastric cancer among the Javanese, especially when compared with the Chinese, and there is every likelihood that this difference too is due to differences in some external factor, the recognition of which might give us valuable information on the ætiology of gastric cancer and might help to establish a prophylaxis of cancer of the stomach.

Susceptibility and Resistance

I have treated the intrinsic factor of susceptibility as being a constant one, inherent in the individual and not affected by external conditions. If it could be diminished it would offer another method for the prevention of cancer. That, however, is still a matter for experimental investigation. I have carried out experiments with that object in view over several years, but as yet with no results. There is, however, experimental evidence that this factor of susceptibility can be increased experimentally by the administration of liver. This has been observed both by Prof. J. Maisin [4] and by my colleague Dr. A. F. Watson.[5] Unfortunately this change is in the wrong direction, but at any rate it suggests the possibility that by other means a change in the right direction might be brought about.

Here also investigations on clinical material might yield important information. In certain parts of the world cancer of the skin is the most frequent form of cancer, for instance, in the south of France and in Australia. Thus, Prof. J. Ducuing (director of the Anti-Cancer Centre of Toulouse) states that cancer of the skin represents 60 to 70 per cent. of all malignant disease.[6] This statement of the high incidence of cancer of the skin is based on the clinical experience of surgeons and radiologists. It is not reflected in the mortality statistics, which for these districts do not show a significantly higher mortality from cancer of the skin than other districts. That means that a very high proportion of these patients is cured. There must therefore be in existence in different parts of the world a considerable number of persons who have once developed cancer and have thus been demonstrated to be susceptible to cancer as far as one tissue—the skin—is concerned. It would be of great interest to follow up the subsequent history of these people, and to find out how many of them develop cancer in some other site, and to compare this frequency with that of the rest of the population. The frequency in the group of individuals cured of cancer must be either less or more than that of the rest of the population, or it may be of about the same order. A higher frequency would indicate that susceptibility to cancer is a property shared by all the tissues of an individual, and that this property is not affected by the development of cancer in one particular tissue. If the frequency is about the same, it would mean that susceptibility to cancer is a property not shared by all tissues alike. A diminished frequency would indicate that the development of cancer in one site increases the resistance to the development of cancer in other sites, and thus protects against a subsequent carcinogenesis in other tissues and organs. Such a result would suggest obvious possibilities.

At the beginning of this paper I stated that the reason why cancer appears to be a mysterious disease is its apparently capricious incidence : in the majority of cases we do not know why one individual develops cancer and another remains free from it, although living under apparently the same conditions. Our ignorance on this point makes it impossible to prevent the disease. The consideration of experimental and statistical data leads to the conclusion that the incidence of cancer cannot be referred to the operation of an extrinsic factor of chronic irritation alone, but must be sought for in a combination of such an extrinsic factor and an intrinsic one of susceptibility. I have tried to show in this paper that if the complex nature of the problem is borne in mind it becomes possible to attack the problem of the external conditions, which lead to cancer in man, for certain sites—namely, those which are responsible for the greatest number of deaths from cancer. This requires a laborious clinical investigation into the detailed history of patients, but it is the only possible way to the prevention of cancer. From the point of view of the prevention of cancer the nature of the intimate cellular change which transforms the normal cell into a malignant one may be of much less importance than appears to be generally believed. We are as yet ignorant of the nature of this change, although in recent years, as a result of the experimental investigation of cancer, several possibilities have suggested themselves ; but even if we did possess a knowledge of this change it by no means follows that this would enable us to identify the external conditions which bring it about. It seems, therefore, that the problem of the incidence and the prevention of cancer has now reached a point where it can be attacked by clinical investigations on man with a reasonable expectation of success.

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POISONING BY BARBITONE AND ALLIED DRUGS

ITS TREATMENT BY LUMBAR AND CISTERNAL DRAINAGE

BY SIR JAMES PURVES-STEWART, K.C.M.G., C.B., M.D. Edin., F.R.C.P. Lond.
CONSULTING PHYSICIAN TO THE WESTMINSTER HOSPITAL;
AND
SIR WILLIAM H. WILLCOX, K.C.I.E., C.B., C.M.G., M.D., F.R.C.P. Lond.
PHYSICIAN TO ST. MARY'S HOSPITAL, LONDON

IN recent years a continually increasing number of cases of poisoning by barbituric acid compounds, including barbitone (veronal), sodium barbitone (medinal), luminal, dial, allonal, proponal, gardenal, soneryl, veramon, nembutal, amytal, and evipan has been observed.

An average minimum fatal dose for barbitone (veronal) is about 50 grains, although death has been known to occur after so small a dose as 15 grains. In some cases very large doses of veronal have been taken—e.g., grs. 100 or more—and unless effective treatment is given within two or three hours of taking the drug these are usually fatal.

The dangerous cumulative effects of these drugs, when taken medicinally on successive nights over long periods, and their tendency to induce a habit, are still insufficiently appreciated. The physiological effects of the barbituric acid compounds comprise not only a specific hypnotic action on the brain but also an effect on the lungs, heart, and kidneys. Large doses or, in susceptible persons, smaller doses cause coma, very commonly accompanied by a rise of temperature with the physical signs of broncho-pneumonia within a few hours of the development of the coma. The heart-rate is quickened and the blood pressure falls, owing to the toxic action on the myocardium. In severe cases heart failure supervenes and is the cause of death. In some cases a toxic action on the kidneys occurs and suppression of urine may result; this has been observed after the administration of nembutal.

It is important to realise that in certain patients—for example, cases of hyperthyroidism or cases suffering from a severe toxæmia—the effects of the barbituric acid compounds are greatly enhanced, so that a dose proper for a normal person may in such cases be dangerous and even fatal. Patients with exophthalmic goitre are specially susceptible to nembutal, and fatalities have followed doses of four capsules (grs. 6) given for anæsthetic purposes in such cases.

One of us (W. H. W.) recently saw a case of septic poisoning (vesico-vaginal fistula), where one capsule (grs. 1½) of nembutal was given on the night before operation and two capsules (grs. 3) were given an hour before operation on the following morning. In this case symptoms of nembutal poisoning supervened, and the patient died in a state of continued profound coma 51½ hours after the operation. Nembutal was found in relatively large quantity in the cerebro-spinal fluid 15 hours before death. In this case heart failure (pulse-rate 140–160) with low blood pressure, 60 mm. Hg systolic or less, was present during the last 24 hours. Uræmia was excluded, since the blood-urea was only 57 mg. per 100 c.cm. 18 hours before death.

In this case the toxic condition of the patient, owing to prolonged sepsis, caused a very greatly increased susceptibility to nembutal, so that a dose small for a normal person became toxic and fatal to this very susceptible subject. Patients with renal and hepatic deficiency are also unduly susceptible to the effects of barbituric acid compounds, and these should be avoided for anæsthetic purposes in such cases.

METHODS OF TREATMENT

Barbituric acid compounds after administration are excreted fairly rapidly in the urine (with the exception of dial, much of which appears to undergo decomposition in the body). They are found in appreciable quantities in the cerebro-spinal fluid.

In the treatment of poisoning by barbituric acid compounds every effort should be made to hasten elimination of the poison from the body; thus the stomach should be washed out with warm water immediately on seeing the case first and this may be repeated at intervals of four to six hours for two or three times. Colon lavage should be given at once and repeated 12-hourly two or three times. Since the coma is prolonged, food should be given by stomach-tube at six-hourly intervals—e.g., coffee, glucose, and peptonised milk in quantities of 15 to 20 oz. Saline and glucose are given per rectum 15 to 20 oz. 12-hourly. Repeated hypodermic injections of strychnine in full doses are also valuable.

Lumbar or cisternal puncture and drainage are carried out at intervals of from 12 to 24 hours, according to the symptoms and severity of the case. The application of cerebro-spinal drainage removes the poison directly from the brain, on which the main toxic effect is manifested. Rapid improvement is frequently observed after each drainage, as shown by return of the tendon reflexes and improvement in in the general symptoms. Cerebro-spinal drainage appears to be the only form of treatment which gives a hope of recovery when pneumonia ("veronal pneumonia") has commenced.

ILLUSTRATIVE CASES

The following three cases provide good examples of the striking beneficial effects which may follow treatment by cisternal and lumbar drainage, supplemented of course by the other means of treatment:—

CASE 1.—Male, aged 55. On Dec. 18th, 1926, owing to overwork and worry took a large overdose of veronal and was comatose for 36 hours. Treatment on the lines indicated above was given when the patient was first seen, six hours after taking the drug. The urine contained 130 mg. of veronal in 100 c.cm. The cerebro-spinal fluid, which was withdrawn 18 hours after the onset of symptoms, contained per 10 c.cm. 5 mg. of veronal (analysis by Dr. G. Roche Lynch). Forty hours after the onset of symptoms patient was confused, ataxic in the upper extremities, speech thick, pupils small but not pinpoint, with reaction to light. Diplopia was present. The plantar reflexes were extensor. Knee-jerks obtained with difficulty. Lungs and heart normal.

This patient made a good recovery, and after seven days all symptoms had disappeared.

CASE 2.—A married woman, aged 40, on Oct. 1st, 1922, owing to an unhappy domestic affair, took grs. 60 of veronal, grs. 15 at a time, within 12 hours. When seen by Sir Bruce Bruce-Porter an hour-and-a-half after the last grs. 15 dose she was drowsy but able to inform him of the amount she had taken. Her articulation was slurred and she had diplopia.

In spite of gastric lavage followed by hot coffee introduced in the stomach, and strychnine hypodermically,

she rapidly subsided into coma. Eight hours after the last dose of veronal she was seen in consultation by one of us (J. P.-S.). She was now profoundly comatose with flaccid limbs. The pupils were small, reacting to light. Temperature 97° F., heart-rate 76. Respiration was feeble and shallow, 32 per minute. The knee-jerks and ankle-jerks were faintly present; the plantar reflexes were extensor in type.

Ten cubic centimetres of cerebro-spinal fluid were withdrawn by lumbar puncture containing 0·043 grain of barbituric acid. At the same time an additional 20 c.cm. were withdrawn by cisternal puncture, containing 0·025 grain of barbituric acid. Within a few minutes after the cisternal puncture, respirations promptly became deeper and the patient moved her limbs feebly in response to stimuli. An hour later when seen by W. H. W. she was still in a state of coma. Atropine in full doses was prescribed and the patient propped up in bed, in order to diminish the probability of pneumonic complications. Fortunately the lungs remained clear. The urine contained veronal grs. 1¼ in 7¼ oz. of urine.

Four hours after the withdrawal of cerebro-spinal fluid the patient woke up and spoke to her nurse. After an additional two-and-a-half hours she rapidly improved and became bright and alert. The diplopia persisted for several days. The knee-jerks and ankle-jerks were still markedly diminished on the following days, with indefinite plantar reflexes.

The patient made a good recovery. The analyses were carried out by Dr. Roche Lynch.

CASE 3.—A married woman, aged 28, after several months of domestic trouble, came home late one night, wrote a letter of farewell to her children and retired to her room at 2 A.M., leaving word that she was not to be called in the morning. She then swallowed the contents of four bottles of barbituric acid compounds, as follows:—

Veronal	..	25 tablets of grs. 5	=	125 grains
Allonal	..	25 ,, ,, 5	=	125 ,,
Quadronox	..	10 ,, ,, 7½	=	75 ,,
Ipral	..	20 ,, ,, 7½	=	150 ,,

making a total of grs. 475. At 4.30 P.M. (i.e., 14 hours later) on a Sunday afternoon, her maids found her unconscious and unable to be roused. One of us (J. P.-S.) was telephoned for from the country 65 miles away and arrived at 8.15 P.M., arranging in the meantime for Dr. J. S. Hensman to go immediately and carry out gastric lavage without delay. This was duly done at 5.15 P.M., the patient then being comatose and stertorous, with cold, clammy skin, and contracted insensitive pupils. The pulse-rate was 180; respirations 24.

At 6 P.M. the stomach was washed out, twice in succession. After the second lavage the patient vomited. Strong coffee was also given per rectum, also caffein and strychnine hypodermically. Numerous urticarial blisters had already appeared on the arms, chest, and lower lip. At 8.30 P.M. she was still comatose and flaccid, with contracted pupils almost insensitive to light. The face was now flushed. The urine withdrawn by catheter was deeply pigmented. The tendon reflexes in the upper and lower limbs were faintly present; the plantar responses were extensor in type. Temperature, 98° F.; heart-rate, 108; blood pressure, 105/80; respirations, 22. 10 c.cm. cerebro-spinal fluid withdrawn by lumbar puncture contained 0·3 mg. of barbituric acid. From 9 P.M. onwards both of us (J. P.-S. and W. H. W.) were now in regular attendance, whilst Dr. Hensman was continuously in residence (three days). Glucose and coffee were given per rectum. Caffeine, coramine, and atropine were administered hypodermically at four-hourly intervals.

During the night the pulse-rate rose to 155. The patient became cyanosed with Cheyne-Stokes' respiration for a time. Crepitations appeared at the bases of both lungs and the temperature rose to 101° F. Next morning, 33 hours after the poisoning, the patient was still comatose. Temperature, 101·4° F.; heart-rate, 124. Respirations were now up to 40. The knee-jerks were absent and the ankle-jerks were mere flickers. The plantar reflexes were still extensor in type. The patient was still profoundly comatose and apparently moribund. Ten cubic centimetres of cerebro-spinal fluid were withdrawn by cisternal puncture, containing a higher proportion (0·5 mg. in 10 c.cm.) of barbituric acid than in the lumbar fluid of the previous evening.

Later on, 37 hours after the poisoning, the patient was still deeply comatose with medium-sized insensitive pupils, absent knee-jerks and ankle-jerks, and extensor plantar responses. Temperature, 101° F.; heart-rate, 128; respirations, 44. Crepitations well marked at both bases, with dullness at the right base. Strychnine, digitalis, and atropine were pushed, together with inhalation of oxygen and carbonic acid.

Forty-three hours after the poisoning the patient was still unconscious, but she winced and moved her limbs in response to pinching. The knee-jerks and ankle-jerks were still absent and the plantar responses extensor. The signs of pneumonia of the right lung were more extensive. A second cisternal puncture withdrew 10 c.cm. of cerebro-spinal fluid containing barbituric acid, although in smaller quantity (0·2 mg. per 10 c.cm.). Fluids were administered continuously both by stomach-tube and per rectum.

Fifty-two hours after the poisoning, following a spontaneous action of the bowel, the patient, still deeply unconscious, became severely collapsed, with imperceptible pulse, and almost died. After strychnine and Digalen hypodermically she rallied. Subsequently there were two attacks of opisthotonos, each lasting two or three minutes, probably due to strychnism.

At 61 hours (two-and-a-half days) after the poisoning the coma became less profound. The patient was now resistant and struggled when the stomach-tube was passed. Temperature, 100·8° F.; heart-rate, 120; respirations, 25. The pupils were now moderately dilated and reacted normally to light. The corneal reflexes were still absent. The ankle-jerks had reappeared, the knee-jerks were present, mere flickers, whilst the plantar reflexes were still extensor in type. The dullness and crepitations at the right base were less extensive. Later in the third day the temperature fell to 99° F. and the heart-rate to 112. Blood pressure was 108/70 and respirations 30. The coma gradually improved and the patient looked round her. The corneal reflexes were now brisk and the knee-jerks and ankle-jerks were normal. The left plantar reflex was still extensor in type; the right was indefinite. The abdominal reflexes were absent.

The right upper limb was œdematous from the shoulder downwards. This swelling had been noticed on the first day of the poisoning; it reached its maximum on the second day and was now subsiding.

The patient was now able to swallow fluids placed in her mouth, and accordingly the stomach-tube was discontinued. Another alarming attack of collapse with greyish pallor and imperceptible pulse, lasting a few minutes, was successfully combated by digalen and strychnine.

By the end of three-and-a-half days the coma had completely cleared up, the patient being now mentally intelligent and alert. The knee-jerks and ankle-jerks were normal and the plantar reflexes were now flexor in type.

The subsequent medical history of the case was uneventful, save for the complication of a complete right-sided musculo-spiral paralysis, motor and sensory, due to pressure on the nerve-trunk in the upper arm against the back of a chair during the first few hours before she was discovered. Troublesome ulceration also occurred at the site of the blisters on the limbs, being most marked in the right hand and arm. The patient made a complete recovery from the effects of the poisoning, the amount of barbiturate taken, and recovered from, being no less than grs. 475. (In this case also the analyses were carried out by Dr. Roche Lynch.)

In this case where pneumonia supervened, as is usual after large doses of barbituric acid compounds, death would undoubtedly have occurred but for the repeated cisternal and lumbar punctures. After each of these operations slight improvement was noticed in the general condition, with improvement in the reflexes. The high-coloured urine was due to the Pyramidon compounds present in the Allonal and Quadronox taken.

CAN A HEAD INJURY CAUSE AURICULAR FIBRILLATION?

BY CRIGHTON BRAMWELL, M.A. Camb., M.D. Manch., F.R.C.P. Lond.

ASSISTANT PHYSICIAN TO THE MANCHESTER ROYAL INFIRMARY

IN 1928 Hay and Wallace Jones[1] reported four cases in which auricular fibrillation seemed to have been initiated by sudden trauma in apparently healthy subjects, two of whom were under 40 years of age. In three of their patients a severe physical effort was responsible for the onset of the arrhythmia, while in the fourth an electric shock was the exciting cause. Similar cases have been reported by other workers, but there does not appear to be any record of auricular fibrillation due to a blow on the head. This possibility merits consideration in the case recorded below, and thereby raises an issue of some medico-legal importance.

CASE RECORD

On Sept. 27th, 1932, a coal-miner, aged 35, was brought to see me on account of auricular fibrillation. He had struck his head on a beam in the colliery on Sept. 5th; and, on the following day, when he consulted his doctor on account of persistent headache and vomiting, the heart-rate was found to be 160 per minute, and its rhythm completely irregular. The man was of an exceptionally phlegmatic temperament. He did not complain of palpitation, and was not aware of the fact that there was anything wrong with his heart.

He had worked in the pit for 13 years and had previously been employed on a farm in Ireland. He stated that he had never been off work on account of illness, and in childhood had never suffered from any serious complaint. There was no history of rheumatism, chorea, or tonsillitis.

The blow on the head staggered him; but he did not lose consciousness, nor did he cut his head. For the first three days after the accident headache was severe and he vomited repeatedly; but when I saw him three weeks later he felt practically well, and in the interval had complained only of occasional slight headache.

He was a healthy looking man of good physique, and weighed 11 st. 8 lb. His colour was good, and mild exertion did not produce dyspnœa, though he said it made him feel dizzy. The heart was not enlarged. The sounds were pure. The blood pressure was 130/85. There was no venous engorgement in the neck, no enlargement of the liver, and no œdema. There were no adventitious sounds in the lungs, and the spleen was not palpable. The urine contained neither albumin nor sugar, the specific gravity being 1030. He had two carious teeth, but otherwise the mouth and throat looked perfectly healthy. The resting heart-rate in the erect posture was 176, and the heart rhythm was characteristic of auricular fibrillation. This was confirmed electrocardiographically (Fig. 1).

In view of the head injury, I asked my colleague, Mr. Geoffrey Jefferson, to examine him from the neurological aspect. He reported that the eyes were normal, there had been no diplopia, the pupils reacted to light and accommodation, and were equal and regular. There was no nystagmus, and no ocular palsies. Vision in the right eye was 6/12 and in the left 6/6. The discs were perfectly normal. The cranial nerves were normal. There were no limb palsies, no weakness nor sensory disturbances, and no paræsthesias. He was right-handed. The grips were very good, the dynanometer readings being right 88 and left 86 lb. All tendon jerks in arms and legs were active, but not abnormally so. They were equal on the right and the left sides. There was no clonus, no muscular incoördination, and no ataxia. The superficial abdominal reflexes were all normal and equal on the two sides. The plantar reflexes were of the flexor type. There was no abnormality of sensation to touch, pin-prick, or two-point discrimination. Mr. Jefferson summarised his findings by saying that there was no gross sign of nervous damage in the usual sense, but that the man had the headache and vomiting of a minor contusion which was clearing up.

When the patient was admitted to hospital three days later, there was no material change in his condition. He had not been given any drug of the digitalis group since his accident. The day after admission he was started on quinidine treatment, and after the third dose of 0·4 g. normal rhythm returned (Fig. 2). Quinidine was then discontinued, and he has since received no drug treatment. Teleradiograms of the heart revealed no abnormality and radiograms of the skull showed no fracture. The Wassermann reaction was negative. The blood count was normal, the figures being: red cells, 4,580,000 per c.mm.; hæmoglobin, 92 per cent.; colour-index, 1·0; white cells, 8700 per c.mm.

The patient was allowed to get up a week after normal rhythm was restored, and was discharged from hospital on Oct. 15th. He has since been kept under observation for 12 months, during which time normal rhythm has been maintained. He has developed no signs nor symptoms of heart disease, and has returned to work.

DISCUSSION

An otherwise apparently healthy young collier was found to have auricular fibrillation when examined a few hours after an injury to the head. The fibrillation persisted for four weeks, and then promptly yielded to treatment with quinidine, since when it has shown no tendency to recur.

It is tempting to suggest that the fibrillation was a result of the head injury. Admittedly there is no proof that fibrillation was not present before the accident; but, in a man who followed the strenuous occupation of a coal-miner, it certainly could not have been present for any considerable time without leading to cardiac enlargement or giving rise to

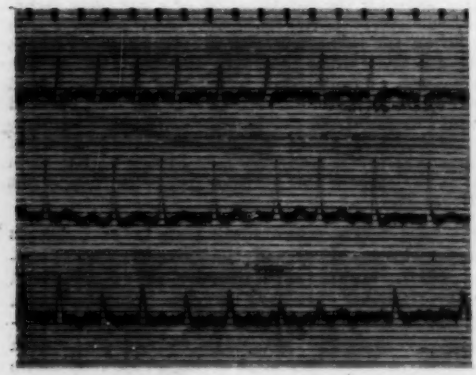

FIG. 1.—Electrocardiogram taken on Sept. 27th, 1932, showing auricular fibrillation. (Time-marker 0·2 sec.)

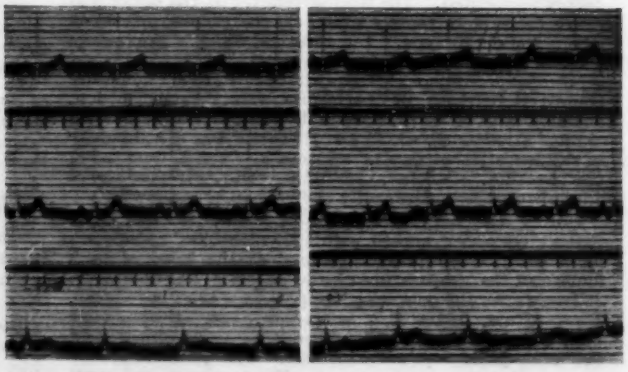

FIG. 2.—Electrocardiograms taken after restoration of normal rhythm by quinidine. That on the left was taken on Nov. 10th, 1932, and that on the right on Feb. 9th, 1933. (Time-marker 0·2 sec.)

symptoms of circulatory insufficiency. Unfortunately the patient himself was unable to help us in dating the onset of fibrillation. He was not aware of its presence, nor was he conscious of any change in the heart's action when normal rhythm was restored.

Auricular fibrillation is most liable to occur in patients suffering from rheumatic heart disease, arterio-sclerosis, high blood pressure, and hyperthyroidism.[3] These four conditions can be excluded in the present case. Nor is there any evidence that it was attributable to any other infection or intoxication.

Paroxysmal fibrillation may occur as the only manifestation of heart disease; and, in Parkinson and Campbell's [3] series of 200 cases, there were 18 in which no apparent cause could be found for the paroxysm. Further these authors express the opinion that paroxysms of fibrillation can occur in people with absolutely healthy hearts. This appears to be true of the present case, though this patient can hardly be regarded as belonging to the paroxysmal group, since fibrillation had been continuously present for four weeks before normal rhythm was restored by quinidine.

Although we know that established fibrillation is prone to occur in association with the various pathological conditions enumerated above, and that the attack may sometimes be brought on by a sudden physical effort, we are still completely ignorant regarding the underlying mechanism responsible for the change in rhythm. The arrest of fibrillation by quinidine is believed to be due to prolongation of the refractory period of the heart muscle produced by that drug; but the mechanism by which fibrillation is initiated is obscure.

Beattie Brow and Long [4] have shown that, in an animal under chloroform anæsthesia, extrasystoles may be induced by stimulating the posterior part of the lateral wall of the third ventricle. This observation suggests that it is not impossible that auricular fibrillation might be produced in a similar manner by irritation due to a lesion such as a small hæmorrhage in that situation, involving the central nervous connexions of the autonomic system. Though such a lesion cannot be excluded, there are no certain grounds for this diagnosis in the present instance. On the other hand, there is no evidence pointing to any alternative causal factor.

Fowler and Baldridge [5] have reported the case of a healthy medical student, 24 years of age, in whom a paroxysm of fibrillation followed removal of cerumen from the ear. The paroxysm was immediately preceded by nausea and syncope—suggesting vagal stimulation—normal rhythm returning spontaneously after 24 hours. In 35 cases collected from the literature by the same authors, fibrillation was attributed to intra-abdominal disease in eight instances, the lesion always being situated in a viscus supplied by the vagus nerve. Fowler and Baldridge suggest that reflex stimulation of the heart through the vagus was probably an exciting factor in this group.

Although it is possible that fibrillation might be initiated by an injury to the brain, it is difficult to accept this hypothesis in view of the strong circumstantial evidence to the contrary. Mr. Jefferson informs me that in a series of several hundred head injuries, he has never met with auricular fibrillation as an isolated phenomenon. Nor is tachycardia a recognised sequel to such injuries, though occasionally it does occur.

In view of the frequency of head injuries, on the one hand, and the commonness of auricular fibrillation on the other, if there were any causal relation between the two, it would almost certainly have been noted in the past.

SUMMARY AND CONCLUSION

A case is reported in which auricular fibrillation appeared to have been produced by an injury to the head, in an otherwise healthy young man. Though the evidence in this particular case strongly suggests that the arrhythmia was due to the trauma, the fact that such a relation has not previously been reported makes one hesitate to accept this hypothesis.

I am indebted to Dr. Alexander MacFaul for bringing this case to my notice.

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THE MECHANICS OF APPENDICITIS

By B. W. Williams, M.B. Oxf., F.R.C.S. Eng.
SURGEON TO OUT-PATIENTS AT ST. THOMAS'S HOSPITAL, AND SURGEON TO MOUNT VERNON HOSPITAL FOR CANCER; AND
R. H. Boggón, M.S. Lond., F.R.C.S. Eng.
SURGEON TO OUT-PATIENTS AT ST. THOMAS'S HOSPITAL

(WITH COLOURED PLATE)

As a clinical entity, appendicitis is recognised in two forms, the acute, which is a definite and reputable disease, and the "chronic," which is often viewed, in retrospect at least, with some suspicion. In the definite or acute form it has been emphasised by D. P. D. Wilkie and others that the disease is in reality an acute obstruction of the appendix in a certain proportion of cases. These writers have, however, claimed only a very modest percentage of cases as being primarily obstructive. Our impression has been that in the acute form obstruction was the rule. In the present paper it is proposed first to examine the pathological mechanics of this acute form, and, by analysis of the results, to see how far the more nebulous chronic form can be vindicated.

The pathological material on which the deductions contained in this paper are based consist of appendices removed from: (*a*) 108 consecutive cases of definitely acute appendicitis, in which necrosis of the organ was not too far advanced for satisfactory microscopy; (*b*) 340 cases reputed to be chronic or recurrent appendicitis. Of the latter 38 were known by us to have had definite attacks of acute appendicitis.

Acute Appendices

Preparation of Specimens.—The appendices were removed with as little damage as possible, fixed whole, and then divided longitudinally in the plane of the mesentery. One half was preserved as a gross specimen and, as far as possible, a portion of the other half was selected for section which showed both diseased and undiseased portions. By this procedure distortion due to the uneven shrinkage of the different layers of the appendicular coat is avoided. Sections were stained with hæmatoxylin eosin, Mallory's connective tissue stain, and van Gieson. The hæmatoxylin and eosin sections were used for general microscopy and the confirmation of the acute condition. The sections stained by Mallory's

connective tissue stain were used for detection of the presence and distribution of fibrosis in the walls of the appendix. It was found that the sections stained by van Gieson's stain showed the same point, but less clearly.

Examination of Specimens.—In 97·2 per cent. of the specimens there was definite evidence of obstruction to the lumen of the appendix, the acute inflammatory process being as a whole confined to the obstructed area. In each case the area of obstruction was found to correspond to an area of thickening and fibrosis of the submucous layer (Figs. I., II., and III. on Plate) often more marked on one side, so producing eccentricity of the lumen. There was usually an absence or diminution in the amount of lymphoid tissues in the fibrotic area, and the inflammatory cells present in less advanced cases were of the chronic inflammatory type, as opposed to the acute inflammatory cells present throughout the distal obstructed portion.

The mucous membrane was, as a rule, flattened or necrotic in the obstructed part, while within the strictured area the mucous membrane was as a rule normal or somewhat atrophied. Diverticula were present in six cases, on the distal side of the stricture. The muscle wall was never involved in the fibrosis; in many cases hypertrophy of the muscle wall on the obstructed side was detectable. No evidence was found of obstruction by external bands or "kinking" alone, though mesenteric fibrosis, associated with "kinking," was frequently found to coincide with submucous fibrotic stricture. Fæcoliths were present in 39 per cent. of cases, and were always associated with definite fibrotic stricture. In two cases some degree of obstruction appeared to have been produced by inflammatory œdema of the submucosa, without obvious fibrous stricture, and in a third abscess-formation was also present. These three cases appear to have been the only examples in the series of primarily inflammatory acute appendicitis, in which localising symptoms developed.

CONCLUSION

(1) In the great majority of cases (97·2 per cent.) acute appendicitis results from acute obstruction to the lumen of the appendix. (2) This obstruction is produced by a pre-existing fibrotic stricture of inflammatory origin in the submucosa.

If in acute appendicitis a pre-existing fibrotic stricture is found in the vast majority of cases, a stricture should inevitably be found in nearly all cases of recurrent appendicitis which are removed in the interval between attacks.

Chronic Appendices

Of 340 cases of chronic appendicitis, 38 were definitely known by us to have had a previous attack of acute appendicitis, and in each of these 38 cases submucous fibrosis was present. These 38 appendices were treated in various ways for microscopic examination, by longitudinal section, transverse section, and by being divided before and after fixation. By whichever means they were prepared, it was found that the distortion produced by a shrinkage of the various layers made it extraordinarily difficult to demonstrate definite pathological lesions with certainty. Fibrosis might be masked entirely by shrinkage and the presence or absence of inflammatory cells depended entirely on the recency of an acute attack—i.e., the absence of inflammatory cells affords no reliable criterion of the absence of the stricture which records the previous attack and which would predispose to a subsequent attack. On the other hand, it was found that if the unfixed specimen was opened up longitudinally, submucous fibrosis was immediately revealed, on naked-eye examination, by thickening of the white submucous layer on the lateral aspect and the irregular distortion of the ribbon of mucous membrane, as shown in Fig. IV. on Plate.

Of the remaining 302 cases, many showed pathological lesions, and it was found that, as a rule, doubt in the finding of fibrosis in the appendix coincided with a dubious history of a previous attack; and in no cases were there signs of chronic inflammation, such as round-cell infiltration, except when associated with stricture formation.

CONCLUSIONS

(1) In recurrent appendicitis a fibrous stricture is present in the submucosa, as in acute appendicitis. (2) In the intervals between acute attacks there may be complete absence of inflammatory cells on microscopy. (3) Chronic inflammatory appendicitis in the absence of fibrous stricture has not been observed.

Discussion

From the above observations it would appear that appendicitis, whether acute or recurrent, is almost invariably associated with the presence of a fibrotic stricture in the submucosa. Suggestions as to the origins of the stricture must be largely speculative. It is thought that a congenital or developmental origin for these strictures can be excluded by the variation in the position of the stricture along the appendix, by its eccentricity, and by the frequent presence of multiple strictures. On the other hand, it is well known that there is a frequent association between acute pharyngeal infections, such as tonsillitis and gastro-intestinal disturbance, or even mild attacks of acute appendicitis. This suggests the possibility that in the presence of an acute infection, the lymphoid tissue in the submucosa of the appendix may be also subject to attack, in fact that the lymphoid tissue is not, as is usually supposed, a strong defensive barrier to infection, but a point of weakness. Whether the infection is blood-borne, as suggested by some authors, or by direct extension from the bowel, would not affect the question. Anatomically, the preponderance of lymphoid tissue in the wall of the appendix and narrowness of the lumen would explain the difference in the consequence of fibrosis in the lymphoid follicles of the appendix and those of other parts of the intestinal tract. Such attacks of lymphoid infection would not give rise to localised or diagnosable signs of infection of the appendix, unless obstruction of the lumen supervened, which, at this stage, would be, and is, an exceptional occurrence. Infection of the lymphoid tissue might, however, result in later fibrosis and stricture, which would determine subsequent attacks of true obstructive appendicitis.

THE late Mr. Robert Douglas, of Rochester, New York State, bequeathed £250,000 to his native village of Scone, near Perth, with the instruction that a portion of the money should be devoted to the provision of a modern hospital at Scone or in its immediate vicinity. A sum of £30,000 has been used to build, equip, and endow the Robert Douglas memorial medical ward in the Perth Royal Infirmary, and the extension was recently formally opened by Miss Douglas, a sister of the testator. The enlargement will accommodate 48 patients who will be received from all parts of the county, preference throughout the whole of the hospital being given to patients from Scone and its neighbourhood.

THE MECHANICS OF THE DIGESTIVE TRACT

BY A. E. BARCLAY, O.B.E., M.D. Camb., D.M.R.E.
LECTURER IN MEDICAL RADIOLOGY AND ELECTROLOGY IN THE UNIVERSITY OF CAMBRIDGE

(WITH ILLUSTRATIVE PLATE)

IN this paper I propose to deal very briefly in general terms with the mechanics of digestion as seen by the radiologist, and to indicate the wide divergencies that exist between the accepted descriptions of the progress of food through the alimentary tract and what is seen by the radiologist in the course of his routine work.

The application of radiological methods to the study of the alimentary tract followed close on the discovery of the X rays in 1896, and the methods employed gradually became extraordinarily successful—so successful, in fact, that in recent years the diagnosis of gastric and duodenal ulcer has become a matter of almost mathematical certainty in the hands of expert workers. It is not my purpose, however, to speak of pathology, but of the enormous field of physiological observation that passes under the eyes of the radiologist in the routine of his gastro-intestinal work. The study of physiology is merely a side-line to him, and that the study of the alimentary tract should, of necessity, have grown up in a pathological environment is a misfortune, for attention was inevitably focused on pathology. Any departure from what we, in our ignorance, regarded as the normal was taken as a possible or probable cause of symptoms. In this pathological environment the radiologist had perforce to learn from experience what he should regard as normal and, naturally, there was much misinterpretation, for there had been no basic study of the normal.

Elsewhere [1] I have demonstrated the extraordinary mobility of the viscera, showing that, in the normal healthy human subject, they have no fixed positions. They move freely in response to gravity, respiration, and contractions of the abdominal muscles. The descriptive anatomy that the medical student learns in the dissecting-room is far different from the "jumble of slithery things in a hole" which the radiologist sees and which is a true picture of the conditions of life in which the viscera fulfil their functions.

The range of possible movement is extraordinary, and it is on this freedom of movement that Nature depends for the efficiency of her mechanics. (Fig. I.) The more one watches the movements of the viscera, the more one marvels at the way in which Nature adapts her mechanism to unusual conditions. She always has some reserve method of overcoming difficulties. In fact, Nature does not accomplish any given purpose always in the same way: she may use one procedure as a rule, but disturb the conditions ever so slightly and the balance may be upset and she fulfils her purpose in another way. Sometimes we can recognise several perfectly normal methods of fulfilling the same purpose, and she uses one or other, or perhaps a combination of them, according to her needs.

We must now realise that the fluidity of the abdominal anatomy is very definitely purposeful. It is more than purposeful, it is essential to Nature's methods. Nature's mechanics are not those of the workshop and the laboratory. Think of the vital difference between any of our mechanisms and those of the alimentary tract. Can we conceive of a mechanism that has no base plate, no fulcrum, no reciprocating or revolving parts, and not a single fixed point from which to exert its force? Our machines conform to a formula and do repetition work in the same way every time. Can we think of any mechanism that will do repetition work in an endless variety of ways, automatically taking up for variations in load and in the consistency of the raw product with which it has to deal? There simply is no comparison between our mechanisms and those of Nature, and we wonder how these work so efficiently. The answer is very incomplete, but it will gradually be unfolded as we watch and clear our minds of the facile explanations that have passed from generation to generation as accepted facts. We cannot explain Nature's mechanisms in terms of ordinary mechanics, for they have hardly one factor in common. It is a muscular system that has no fixed point between the mouth and the anus (unless we make a partial exception for the cardiac orifice that has an excursion of some inches with the diaphragm). As a whole, it is a muscular tube that, having no fixed points, can only exert pressures by contractions within itself. In a word, the tract is fundamentally different in every respect from the mechanisms to which we are accustomed, and not only is a knowledge of our mechanics useless in explaining the methods which Nature uses, but it is definitely dangerous, for we instinctively attempt facile explanations of Nature's methods in terms of the mechanics that we know and understand, and these are not applicable. Her ways are so very different that we would be well advised not to attempt to find parallels.

The radiologist is at a great advantage in that he studies normal and abnormal human beings directly and under relatively natural conditions. There are very few abnormal factors to discount the validity of what he sees. But he does not see the walls of the stomach and intestine; he only sees their contents, and his conception of the walls and their movements are deduced from the effect on the contents. Also he has, perforce, to use opaque foods that are heavier than those normally eaten; but this possible source of error seems to be rather theoretical than real, since the weight of the food seems to have little if any influence, unless unnecessarily large quantities are used.

SWALLOWING

I believe that X ray methods of investigation can suggest with considerable accuracy the mechanisms involved. For instance, as the result of many observations I came to the conclusion that the act of swallowing must usually be accomplished by negative pressure.[2,3] I had no doubt that this explanation of observed facts was correct. Prof. Anrep then kindly coöperated, and, using an open catheter in the pharynx, he recorded the pressures and proved that the X ray deductions were true. (Fig. II.) This negative pressure varied according to the subject and to the nature of the bolus to be swallowed. In my own case, swallowing dry but masticated bread, it amounted to 18 inches of water. This very high negative pressure only lasted for about an eighth of

[1] Barclay, A. E.: The Digestive Tract. London: Cambridge University Press. 1933. Most of the observations referred to in this paper are recorded in detail in this volume, together with the references.

[2] Brit. Jour. Radiol., 1930, iii., 534.

[3] James and Hastings (Proc. Roy. Soc. Med., 1932, xxv., 39, Sect. of Odontology) have now demonstrated that negative pressure is normal in the mouth also.

a second; but, even so, it was sufficient to carry the bolus from the back of the tongue to the level of the clavicle.

The mechanism takes place so rapidly that it is very difficult to analyse, but it is clear that some people use this negative pressure far more than others and that few seem to depend on propulsion as described in the text-books. This latter form of swallowing is, for most people, a reserve mechanism that is brought into action only when the subject has difficulty in effecting the act of swallowing—e.g., when he attempts to swallow too large a bolus. A distended balloon in the pharynx gives the same impression to the senses, for it will not pass on, and the pressures recorded by this means are those exerted by the walls in the act of an abnormal contraction that is designed to displace the bolus (the balloon). The balloon records the contraction of the walls, not the effect of these contractions on the cavity.

PASSAGE OF FOOD THROUGH THE ŒSOPHAGUS AND STOMACH

From the level of the clavicle onwards to the cardiac orifice food passes down less rapidly. (Fig. III. on Plate.) We do not see evidence of peristalsis as a rule, but if the patient swallows when lying on an inclined couch so that his head is lower than his feet, definite peristalsis is seen. Peristalsis seems to be used only as a reserve mechanism, but it is not at all clear what other forces are operating. Whether the negative pressure recorded in the upper œsophagus is also at work lower down, whether the muscularis mucosæ plays a part, I do not know. Gravity seems to play very little part; in fact the time taken by the passage of the bolus in the upright position hardly differs at all from that in the recumbent posture.

At the cardiac orifice we can observe three distinct types of mechanism. Thin fluids and also usually well-masticated foods slip straight through with no indication of sphincteric action. The impression is that of a patulous and freely open tube. But in some cases the bolus collects in the œsophageal ampulla and waits there until a wave of peristalsis is seen pressing it downwards and pushing it through into the stomach. This seems to be a reserve mechanism that is frequently used, especially if the food is not well masticated. There is also a third mechanism, which is seldom seen, by which the lower end of the œsophagus appears to be invaginated into the stomach in the same way that the rectum is ectroverted by the horse when it defæcates. I first saw this mechanism 20 years ago in a very well-marked case of cardiospasm in which the whole of the contents of a much-distended œsophagus were rapidly extruded into the stomach in a solid column. There was no sign of narrowing at the site of the cardiac orifice. I have sometimes seen this mechanism, but in a much lesser degree, in normal healthy students.

GASTRIC PERISTALSIS

Many workers have attempted to analyse the normal movement of peristalsis in the stomach and have described various types in which from one to five waves were noted on the walls of the stomach at any given moment. It was found, however, that no one type was persistent and that, although the rate of the passage of the waves remained more or less constant, their frequency might change without apparent cause. There seemed to be little practical importance in the study of peristalsis which exhibited such wanton vagaries that no type could be regarded as a definite expression of the normal. Hence radiologists neglected this feature unless it was obviously abnormal as, for instance, in early obstruction of the pylorus that was becoming acute. Under normal conditions we see very little peristalsis in the stomach; the waves pass smoothly over the surface and there is no suggestion that they are churning the contents. They are merely like the ripples running on to a sandy shore that tend to carry, but not to propel, the sea drift towards the land. They do not give the impression of a propelling force. Only under abnormal conditions are really powerful waves seen. (Fig. IV. on Plate.) Gastric peristalsis is clearly a reserve force, only called upon when necessary.

THE OPENING OF THE PYLORUS

Under normal conditions gastric peristalsis exerts little or no propulsive effect on the food. Quite frequently we see the food passing on when the stomach is exhibiting little or even no peristalsis at all, especially when the subject is in the erect posture. (Fig. V. on Plate.) It is clear, therefore, that there are other forces at work that tend to empty the stomach, both in the upright and horizontal positions. What these are I do not pretend to know, but I suspect that the tonic action of the stomach is very largely responsible. Normally, the intermittent opening and closing of the pylorus does not seem to be controlled or even related to the peristaltic effort or to the acidity or alkalinity of the food in the stomach, but to take place in response to stimuli that are referred from other regions, particularly the small intestine and ileocæcal valve.

THE DUODENUM

The first part of the duodenum is functionally different from the rest. It forms a cocked-hat shape which the radiologist calls the duodenal cap. In it the food is retained in very much the same manner as in the stomach. The gastric peristalsis stops dead at the pylorus and does not affect the duodenum, in the first part of which there are no circular fibres, but beyond this point an extraordinary change in the mechanism takes place and observations become increasingly difficult because at this point, and quite suddenly, the bolus of food is shredded up and subdivided to such an extent that it disappears on the fluorescent screen, and on an X ray film that is exposed in a fraction of a second it looks no more than a snow-shower of opaque particles. (Figs. V. and VI. on Plate.)

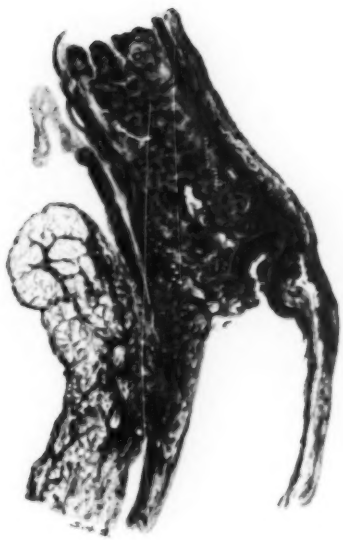
It is not clear how the food is propelled from the duodenal cap. It is not often that one gets a satisfactory series of films, a series taken in a few seconds that throws light on the point. A study of the series (Fig. VII. on Plate) suggests that in this case the cap is being voided by a general contraction and that in (*a*), (*b*), and (*c*) the food is being passed on in quantities that are easily fragmented, but that a moment later (*d*) such large quantities have been passed that fragmentation is incomplete. Nevertheless there is no sign of peristalsis. The reason for the overloading, in this case, seems to be that in (*c*) the pylorus is very patent, and probably between (*c*) and (*d*) the gastric peristalsis has pushed a considerable quantity through the pylorus and this has gone straight through the contracted cap into the second part of the duodenum.

It is very unsafe to make deductions from the slender and incomplete evidence of ordinary serial radiograms. We must await detailed cinematographic studies of a number of such happenings, for the mechanisms employed appear to be too rapid for these methods of investigation.

The question as to how the food bolus is broken up in such a dramatic fashion is very obscure. It

FIG. I

FIG. II



FIGS. I. and II.—Longitudinal sections (x 4) of obstructed area in two cases of acute appendicitis, stained with Mallory connective tissue stain. The fibrous tissue shows blue; muscle tissue, mucous membrane, and inflammatory cells show purple.

FIG. IV

FIG. III

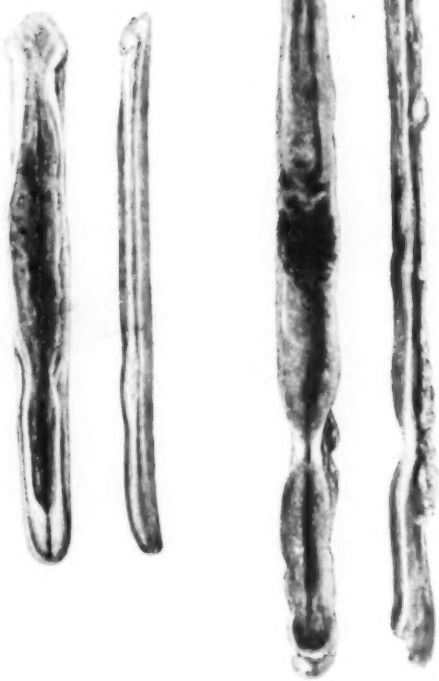
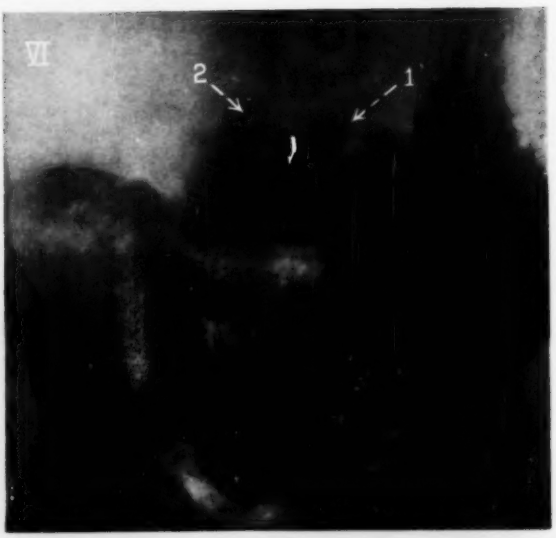


FIG. III.—Longitudinal section (natural size) of an example of acute appendicitis, fixed but unstained. Striated muscle beige; fibrous tissue white; mucous membrane, etc., brown.

FIG. IV.—Two appendices, removed in the quiet period, opened longitudinally before fixation, showing strictures in the submucosa. Frontal and lateral views. (Natural size.)



DR. BARCLAY: MECHANICS OF THE DIGESTIVE TRACT

FIG. I.A

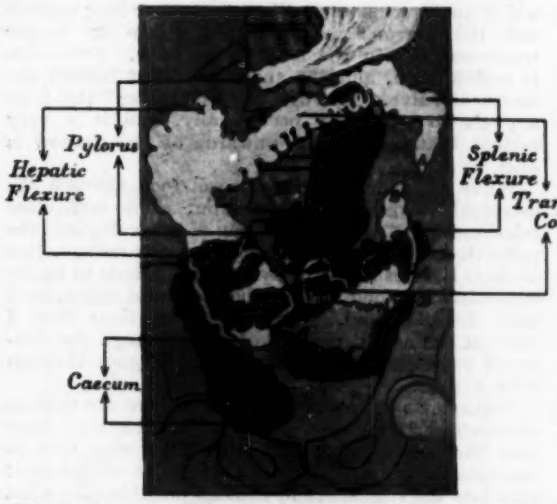


FIG. I.B

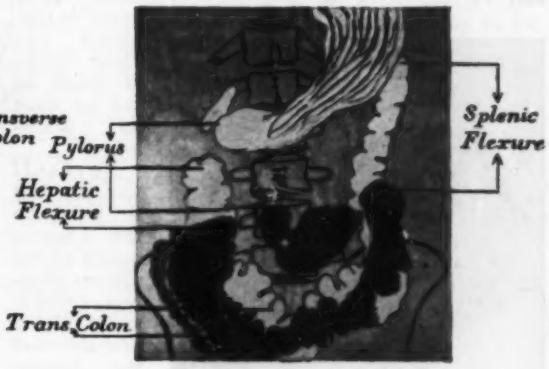


FIG. I.—Composite tracings from radiograms of two healthy subjects, showing the extremes of movement due to the combined effects of posture and respiration. The dark shadows of the viscera are traced from radiograms taken with the subjects standing and in the extreme phase of *inspiration*. The light shadows of the viscera are traced from radiograms taken with the subjects lying supine and in the extreme phase of *expiration*. Moreover, the abdominal muscles are retracted, causing a considerable movement in addition to that obtained by respiration alone. The extraordinarily wide range of movements indicated is somewhat exaggerated by the radiographic technique owing to the divergence of the X ray beam.

FIG. I.A. From a medical student of rather tall, slim build. The excursion of the lower border of the stomach as measured on the abdominal wall was recorded as 9 in. In the radiograms, however, there was not quite such a big disparity as the subject could not hold the stomach in the position into which he was able to jerk it by the action of his abdominal muscles (he was watching the effect of his movements with a looking-glass).

FIG. I.B. A woman of 27. Note that although the flexures of the colon show marked movement, yet the transverse colon hardly moves at all. Obviously it is anchored down into the pelvis by some adhesions. The transverse mesocolon must be unusually long to allow of such free upward movement of the stomach.

seems to occur in one definite spot—i.e., at the apex of the duodenal cap. It is so effective that within, say, half an inch the bolus is reduced to such fine division that it appears on an instantaneous radiogram as a very faintly visible shower of fine snow-flakes in the second part of the duodenum and onwards. Studying these on a series of films of different subjects the general disposition of this snow-shower is in more or less transverse folds. One point seems to be perfectly definite: the lumen of the duodenum beyond the cap is not contracted, for we can trace the fine shadows throughout the whole width, perhaps half to three-quarters of an inch, and cannot make out that there are narrowings such as would indicate peristaltic waves. (Figs. V. and VI. on Plate.)

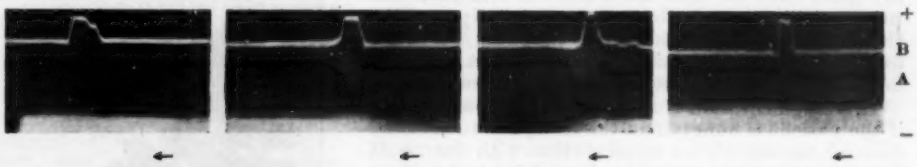


FIG. II.—Typical graphs of pressures in the pharynx during swallowing. (A) Pharyngeal pressure. (B) Movement of the larynx simultaneously recorded on a tambour. The vertical lines represent 1/25th of a second, the horizontal lines in this setting correspond to about 3 inches of water. (Prof. Anrep.)

Every indication is in the direction of some mechanism other than peristalsis of the muscularis propria as being the prime force. As there is only one other muscular possibility, it seems to be reasonable to

LEGENDS TO ILLUSTRATIONS ON SPECIAL PLATE

FIG. III.—Thick food sliding down the œsophagus. (1)=aortic arch.

FIG. IV.—Excessive peristalsis in a case of spasmodic pyloric obstruction due to a small pyloric ulcer (supine posture). Some food has passed and is seen in the duodenum. P=pylorus.

FIG. V.—Practically no gastric peristalsis, and yet the stomach is emptying. Note the filled duodenal cap (1) and the "snow-shower" in the second and third parts of the duodenum (2). The outline of the walls of these parts can be made out and there is no indication of peristalsis.

FIG. VI.—Average type of gastric peristalsis. Stomach emptying and the food fragmented in the second part of the duodenum (2) as in Fig. V. As the food progresses in the small intestine it tends to collect into definite masses again. (1)=the duodenal cap.

FIG. VII.—Emptying of the duodenal cap. Four serial radiograms taken in a period of about half a minute. The cap appears to be emptied by a general contraction which seems to take place from above downwards—i.e., like a reverse peristaltic wave. The cap seems to go on emptying while the pylorus is still open (*c*). In this picture (*c*) a wave of gastric peristalsis is seen close to the pylorus and it is probable that the large quantity of food passing through the second part seen in (*d*) has been propelled by this wave through the contracted duodenum.

FIG. IX.—After the first part of the jejunum is passed the movement quiets down, the food shadow concentrates, and towards the terminal ileum no movement is seen over long periods. (Kindly lent by H. K. Graham Hodgson.)

suppose that this fragmentation and also the onward flow of the bolus is accomplished by the action of the muscularis mucosæ. Whether there are also other forces at work it is not possible to say, but in view of the way in which Nature provides alternatives and variations in mechanism, I think it highly probable that there are other factors of which as yet we have no knowledge.

FIG. VIII.—Rather rapid emptying. Duodenal cap full and a large quantity passing unsegmented through the second part. (A) A fleck of food in the pyloric antrum that would, in a fraction of time later, have passed back into the stomach. (B) Duodenal cap. (C) Large bolus passing through the duodenum.

Forssell was the first to point to the movements of the mucous membrane, and it seems highly probable that the muscularis mucosæ, with which the intestine is so freely endowed, is largely responsible for the efficient mechanical segmentation of the bolus of food as it leaves the first part of the duodenum. Until efficient cinematographic radiography is developed for the study of the duodenum and upper jejunum, we shall not be able to analyse the mechanism by which it is accomplished, but there is little doubt in my mind that the muscularis mucosæ will be found to be the chief factor both in segmenting and propelling the food along. Peristalsis will probably be found to play a part, but I think it likely that it will be a much less important part than has been assumed.

This fragmentation is not always seen, particularly if the patient is hungry and the food passes out of the stomach too rapidly for segmentation, with the result that large quantities pass on (Fig. VIII.) and often definite effects of peristaltic movement are observed in the walls as the shadows pass through the duodenum. Waves seem to toss the food forwards and to a lesser extent backwards again, even back into the stomach, and to take some part in this segmentation mechanism. But once more the peristaltic movement seems to be a reserve force, and the finer and much more active movement is that which usually effects the segmentation.

THE SMALL INTESTINE

In the upper part of the small intestine the opaque food is always on the move, generally in a rapid manner. The disposition of the shadows suggests (Fig. VI. on Plate) that the mucous membrane is, for the most part, in transverse folds that are constantly moving. Whether peristalsis is a propelling force in the small intestine under normal conditions is not clear, but I suspect that the muscularis mucosæ plays the major part. It is also possible that negative pressure may take a share. Of this there seems to be some indication in the Alvarez film of exposed animal intestine, but the evidence is far from definite.

As the food progresses in the jejunum it begins to collect once again in definite shadows, and the movements are much less active (Fig. IX. on Plate), until in the terminal ileum we find a picture of still life in which no movements at all are seen over long periods and the mucous membrane folds are no longer transverse but in the axis of the tube. Peristalsis is seldom seen, and the shadows collect behind the ileocæcal valve. Through the "sphincter" the food appears to pass only occasionally, and it is very seldom that the passage onwards of the shadow is seen.

What determines the passage of food through the ileocæcal valve is not clear, but there is a close relationship between the opening of this valve and the pylorus, as A. F. Hurst showed many years ago, just as there is a closure of the pylorus in response to undue collections of food behind the ileocæcal valve, as I have demonstrated. The few observations that I have of the actual passage of food through the ileocæcal valve seem to indicate that it goes through with a rush.

Perhaps, as at the cardiac orifice, there are various alternatives. On two occasions I have seen food pass through in large quantities in a way that is comparable to the invagination of the œsophageal food into the stomach, and it seems possible that what I saw represented the invagination of the terminal ileum into the cæcum. I have never seen food passing into the cæcum in a thin stream as through a sphincter.

THE LARGE INTESTINE

In the large intestine, radiologists early noted that the peristaltic, pendulum, and other movements described were not seen. (Fig. X.) The whole of the large intestine, outlined with bismuth food, was a picture of still life divided up into segments

FIG. X.—Normal large bowel, completely filled.

(haustral segmentation) like a string of chestnuts. There was no suggestion of peristalsis, yet between examinations a few minutes apart the disposition of the food might have entirely changed and the head of the column progressed through many inches, perhaps from the transverse colon to the rectum. It was not until 1911 that Holzknecht saw the con-

tents of the colon travel rapidly, en masse, and suggested that this could be regarded as responsible for the changes in disposition that every radiologist noted in his routine examinations. (Fig. XI.) Shortly

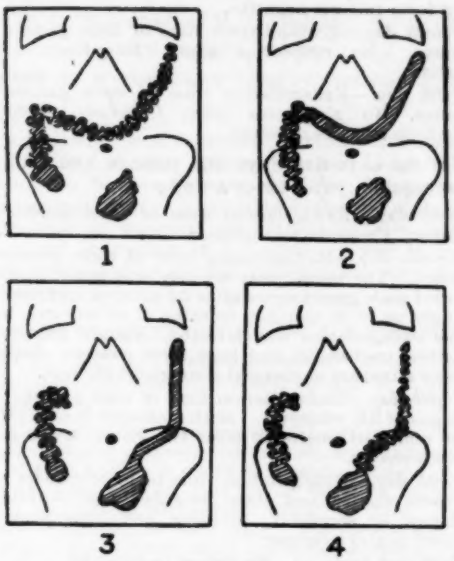


FIG. XI.—Holzknecht's diagrams of the happenings in mass movements of the large intestine. (1) Distribution of the food before any change was noted. (2) The haustral segmentation in the transverse colon has disappeared. No point d'appui is seen. (3) The whole colon beyond the hepatic flexure passes on suddenly. (4) It is again a picture of still life a few seconds later and the haustral segmentation has returned.

afterwards I saw and recorded two instances, and later both Hurst and I made observations on students whose large intestines were outlined by an opaque meal taken the night before. We examined these students as they took their breakfast in the X ray department.

There seemed to be no doubt that this mass movement was the one really important factor in moving the food onwards. It is not like an ordinary peristaltic movement. The haustral segmentation disappears and the food becomes a continuous ribbon. Then at the proximal end, usually in the hepatic region, a contraction segments the shadow. This I regard as a point d'appui that prevents regurgitation. Then the intestine contracts as a whole, or perhaps a very rapidly progressing and powerful peristaltic wave starts from the point d'appui, and the whole mass distal to this point is rapidly displaced towards the rectum. There are no subjective sensations whatever, and within a few seconds there is again a picture of still life and the haustral segmentations reappear.

There may be other movements in the walls of the large intestine, but they do not seem of much importance. Unlike the small intestine, there is no indication that the muscularis mucosæ takes any part as a propelling force. The changes in shape of the haustra that have been recorded may indicate something in the nature of a very slow peristalsis, but they will not account for the rapid displacement of the contents which so frequently takes place between observations. Peristalsis in the ordinary sense is only seen in cases of old-standing obstruction, such as are now very seldom met with, for such cases should be operated on long before such a condition develops.

SUMMARY

The normal mechanism of the propulsion of food through the alimentary tract can only be seen under normal conditions by radioscopic methods. Normal movements depend on the free mobility of the viscera. Under restricted conditions, or when the abdomen is opened, such movements as are seen are likely to be reserve mechanisms or distortions of natural movements. Nature adheres to no set form, and may perform the same function in several ways. Radioscopic observations suggest that in the upper part of the tract peristalsis is a reserve mechanism: under normal conditions the food is propelled mainly by other means, such as increased tonic action and movements of the mucous membrane, perhaps also aided in some parts of the tract by the development of negative pressures ahead of the oncoming food. In the lower tract there is no rhythmic peristalsis, but only occasional and infrequent projection of the contents through considerable lengths of intestine.

SELECTIVE ACTION OF ATEBRIN AND PLASMOQUINE UPON THE SUBTERTIAN MALARIA PARASITE

(PLASMODIUM FALCIPARUM)

BY P. H. MANSON-BAHR, D.S.O., M.D. Camb., F.R.C.P. Lond.

PHYSICIAN TO THE HOSPITAL FOR TROPICAL DISEASES, LONDON, AND TO THE ROYAL ALBERT DOCK HOSPITAL; AND

A. H. WALTERS

SENIOR TECHNICIAN, PATHOLOGICAL LABORATORY, SEAMEN'S HOSPITAL, ROYAL ALBERT DOCKS

THE selective action of atebrin upon the asexual forms of plasmodium were first noted by W. Kikuth,[1] who proved that it was an effective schizontocide in the case of *Hæmoproteus orizivoræ* present in the blood of the Java sparrow, differing in this respect from plasmoquine, which is essentially a gametocide and which extirpates the gametocytes of this protozoon after the schizonts have disappeared from the blood. It is seldom, however, that an opportunity presents itself in this country of observing a naturally acquired subtertian malaria in which the different stages of the subtertian parasite—schizonts and gametocytes—are sufficiently numerous to enable the *modus operandi* of the two drugs—atebrin and plasmoquine—to be worked out minutely upon the same patient.

The patient, an Indian seaman from Calcutta, was suffering from clinical malaria, was emaciated and acutely ill. His blood contained large numbers of the ring form (schizonts) and gametocytes (crescents). Confirmation of the inability of atebrin to influence the crescents and the ability of plasmoquine to do so was obtained by one of us, A. H. W., acting under the direction of P. M.-B.

The chief points to be noted in this résumé are the rapidity with which the ring forms of the parasite disappear after 0·9 g. of atebrin has been administered and the almost instantaneous effect of plasmoquine upon the crescents. So sensitive does this stage of the parasite appear to be, that the process of exflagellation is almost immediately affected, and it is seen to affect equally in both male and female forms. After the administration of 0·04 g. plasmoquine, exflagellation no longer took place, whilst the female

[1] Deut. med. Woch., 1932, lviii., 530.

gametocytes *failed to change their customary crescentic shape on being subjected to the wet coverslip method.* Although it is generally understood from clinical observation that this is the mode of action of these two drugs, yet we have failed to find in the literature any confirmatory observations on this point. Hence we consider the protocols of the case worthy of record. It is further to be noted that the atebrin observations on the schizonts were controlled daily by blood cultivation by Sinton's method.

The patient, aged 24 years, was admitted to the Royal Albert Dock Hospital on June 14th, 1933, complaining of restlessness and loss of sleep, accompanied with irregular temperature for 15 days previously. His general condition was good, heart and lungs normal, large spleen, and pale conjunctiva. The blood count was as follows :—

Red cells ..	3,860,000	Polymorphs ..	67%
White cells ..	11,250	Lymphocytes ..	16%
Hæmoglobin ..	70%	L. mononucl. ..	2%
Colour-index ..	0·92	Eosinophils ..	14%
		Basophils	1%

Subtertian malaria parasites were detected and blood was found to contain 1870 crescents (male), 3190 crescents (female) and 1100 ring-forms per c.mm. In the fæces no protozoa were seen, but ankylostome and ascaris ova were detected. A routine Clayton-Lane concentration test showed ankylostome ova = 163 per c.cm.; ascaris ova = 54; and trichuris ova = 1 per c.cm. of fæces. In the urine nil abnormal was found and in the sputum no tubercle bacilli were seen. The Wassermann reaction and the Kahn test were negative.

In order to study the selective action of atebrin and plasmoquine on the ring-forms and crescents respectively, the following experiments were carried out. The coverslip method of exflagellation,[2] made it a simple matter to observe the action of plasmoquine on the crescent forms, and for controlled observation of the ring-forms under atebrin, cultures were prepared by Sinton's method.[3]

Five cubic centimetres of blood was removed from the median basilic vein of the patient and placed in a stout glass test-tube containing a few glass beads. The cotton-wool plug of the tube was then replaced by a sterile rubber stopper and the blood shaken vigorously by hand for five minutes. 0·2 c.cm. of 50 per cent. aq. sol. of glucose was then added to the blood, and the whole reshaken as before. 1 c.cm. of the shaken blood was then placed into each of 5 sterile 4 in. by ⅜ in. tubes. To each of these, 0·5 c.cm. of the patient's own blood-serum was stratified and the tubes incubated at 37° C. Blood-films from each tube were examined at hourly intervals for 48 consecutive hours by means of extracting blood from immediately beneath the stratified layer with a teat-pipette.

Thickened ring-forms were first detected after 14 hours' incubation and several *Plasmodium tenue*-like ring-forms were noted after 16 hours at 37° C. Half to three-quarter grown forms were detected after 22 hours and a number of bodies with the appearance of atypical schizonts were seen after 30 hours. These were vacuolated and did not show the typical division of chromation and segmentation.

Having thus observed that the ring-forms were active and could be cultured, treatment was begun on June 23rd, control cultures being prepared on each of the first five days and exflagellation tests made throughout the whole ten days of treatment. For the first five days atebrin 0·1 g. was given three times daily with the following results :—

First day.—Exflagellation time of male gamete = 14 minutes. No changes in ring-forms seen. Developing ring-forms seen in culture.

Second day.—Exflagellation time of male gamete = 18 minutes. No change in ring-forms seen. No development of ring-forms in culture.

Third day.—Exflagellation time of male gamete = 15 minutes. Ring-forms very scanty. Crescents unchanged. Ring-form cultures negative.

Fourth day.—Exflagellation time of male gamete = 16 minutes. No ring-forms seen. Ring-form cultures negative.

Fifth day.—Exflagellation time of male gamete = 13 minutes. No ring-forms seen. Crescents unchanged. Ring-form cultures negative.

For the next five days the patient had 0·02 g. of plasmoquine (pure) twice a day :—

Sixth day.—Exflagellation time of male gamete = 14 minutes. Crescents unchanged.

Seventh day.—Exflagellation time of male gamete = 0 minutes. The usual great activity was noted inside the rounded male gametocytes after 22 minutes and continued strongly up to 55 minutes, finishing at 65 minutes, but no actual exflagellation was detected. Female gametocytes remained unchanged and kept their crescent shape and interior structure unchanged throughout the test.

Eighth day.—Exflagellation time of male gamete = nil. No signs of life whatever. Both male and female gametocytes remained unaltered after two hours, keeping their crescent shapes.

Ninth day.—Exflagellation time of male gamete = nil. Crescents scanty and show irregularity of outline and tendency to serration. Staining and arrangement of pigment is also irregular.

Tenth and final day.—No crescents detected.

Blood films examined daily up to ten days, after completion of treatment, fail to reveal any parasites, but punctate basophilia and an occasional red blood corpuscle showing anisocytosis and polychromatophilia can still be seen. The count on the tenth day was :—

Red cells ..	4,200,000	Polymorphs ..	62%
White cells ..	12,812	Lymphocytes ..	13%
Hæmoglobin ..	80%	L. mononucl. ..	2%
Colour-index ..	0·94	Eosinophils ..	23%
		Basophils	0

On the 11th day after commencement of treatment a marked attack of atebrin-staining was noted all over the body and face, but this disappeared entirely after the 19th day without any treatment.

The spleen, which on admission was felt to be 2½ in. below the costal margin, was only just palpable after 12 days from commencement of treatment. No rise in temperature noted after the 3rd day.

Treatment for ankylostomiasis commenced on July 12th, and fæces were clear of ova on the 18th. He was kept under observation until July 27th, during which time blood and fæces were normal. Blood count prior to discharge showed: red cells, 4,800,000; white cells, 7500; Hb., 90 per cent.; and C.I., 0·93. The patient resumed work at once and sailed for India on July 28th.

It will be observed that in this case atebrin inhibited the cultural growth of ring-forms after 24 hours and caused their disappearance from the blood inside four days, but had no effect whatever on the gametocytes. Male and female crescents were observed to assume the round forms and the males to exflagellate in almost precisely the same number of minutes on the fifth day as on the first day, but at the end of the seventh day, after the patient had received 0·8 g. of plasmoquine, a complete inhibition of the female gamete was noted, and a curious partial inhibition of the male, which "rounded" and showed internal activity as usual, but failed to proceed to exflagellation. On the eighth day the crescents appeared to be quite inert, and on the ninth they were fewer and showed irregularity in outline and staining, whilst on the tenth day none was detected.

[2] Described in Manson's Tropical Diseases, 9th ed., London, 1929. p. 680.

[3] Ibid., p. 866.

THE DIAGNOSIS OF MENINGOCOCCAL MENINGITIS FROM THE SPINAL FLUID

By B. G. Maegraith, M.B. Adelaide, B.Sc. Oxf.
BEIT MEMORIAL FELLOW
(*From the Sir William Dunn School of Pathology, Oxford*)

The following is a summary of recent methods of identification of the meningococcus designed to shorten the time necessary for the diagnosis of cerebro-spinal fever. A short preliminary account of experiments in progress at Oxford is also given. It is hoped that some of the methods will be more fully investigated in clinical laboratories throughout the country.

METHODS OF IDENTIFICATION OF THE ORGANISM

(*a*) *The use of antimeningococcal serum agar plates.*—The medium for this test should be made up as follows:—

Five per cent. antimeningococcal horse serum (made by the inoculation of horses with recently isolated meningococci of type I.–III.) is added to a warm solution of 2·5 per cent. agar, pH 7·6, just before the agar begins to solidify and plates are poured, about 15 c.cm. of the medium being used for each plate. The further addition of 3–5 per cent. normal rabbit blood, laked with glycerin or water, at the same time as the serum makes a clear red medium on which the meningococci grow with great rapidity. The serum used should be free from preservative. Antimeningococcal rabbit sera have been found to be of little value for the test.

The test is performed in the following manner. The cerebro-spinal fluid is centrifuged and the deposit is smeared direct on to the antiserum agar medium, or else on to Dorset's egg medium and transferred later as a stab inoculation to the antiserum agar plates. A total incubation of 12 to 24 hours at 37° C. is sufficient for the test.

If the organism grown from the fluid is a meningococcus of the type I.–III., a faint white halo will develop in the medium around the growth and will be clearly visible by transmitted light against a black background. The development of this halo may be taken as positive evidence of the presence of this type of meningococcus, for no other organism is known which will develop a halo in this medium in the short time necessary for the test, although some contaminant fungi may develop irregular haloes after several days' incubation. In the few cases where the organism appears to be narrowly specific to type I. or III. the haloes of the two types may be distinguished from one another, the former being thin and close to the growth and the latter being diffuse and more evenly distributed.[1 2]

Types II. and IV. have not yet been found to develop haloes even in their homologous antiserum agar medium, but if a Gram-negative organism with no accompanying halo is grown from the spinal fluid, it may be taken as a meningococcus belonging to one of these types.

This method of diagnosis has been tried with success in a few cases at the Radcliffe Infirmary, Oxford, but the cases available there are too few in number for a full investigation of the test.

(*b*) *Direct slide agglutination of the organism.*—Once the organism has been grown on the blood antiserum agar medium described above, further identification can sometimes be accomplished by agglutination, employing a simple microscopic technique. The four stock diagnostic rabbit antisera may be used for this test and set up on slides against a fresh suspension of the organism in saline. Incubation for 20 minutes at 37° C. under moist conditions is usually sufficient. The suspension of the organism must be approximately equal in density to that of the standard agglutinable suspension of meningococci (2000 million organisms per c.cm.), otherwise the results are unreliable.[3]

Agglutination often occurs simultaneously in more than one serum, but one slide will usually be more affected than the others. If the organism is a genuine type II. meningococcus, agglutination will occur mainly in antiserum II. Agglutination in sera I. and III. usually occurs simultaneously, as types I. and III. appear at present to be closely inter-related and their differentiation does not seem to be of great practical importance.[4 5]

Slide agglutination is not always reliable, as some organisms on first isolation will not agglutinate even when the macroscopic technique is used. The reverse of the process, the direct agglutination of standard type suspensions in the cerebro-spinal fluid, is very irregular and uncertain.

TESTS ON THE SPINAL FLUID DIRECT

(*a*) *Precipitation with antimeningococcal sera.*—The presence of precipitinogens in the spinal fluids of patients suffering from meningococcal meningitis has been known since 1909, when Vincent and Bellot demonstrated that precipitates formed in clear centrifuged fluids from cases of the disease on the addition of polyvalent antimeningococcal horse serum.[6] Most fluids from cases of meningococcal meningitis examined by these authors gave positive results and normal and other fluids did not precipitate except occasionally those from cases of pneumococcal meningitis. The results of precipitin experiments obtained by workers since Vincent and Bellot have been irregular, but recent work by Ginsburg, Kalinin, and Guljaewa in Russia,[7] and Rake in America[8] has shown that the results obtained with modern antisera appear to be sufficiently consistent for the diagnosis of the disease. Ginsburg and his co-workers, in the discussion of the complement-fixing powers of spinal fluids from cases of meningococcal meningitis, report 60 known meningococcal fluids of which 40 gave a precipitate with the polyvalent antiserum used for the complement fixation.

Rake investigated the precipitin reactions of spinal fluids from 23 cases of meningococcal meningitis in all of which the organism was isolated and typed by agglutination. Fifteen of these fluids were from cases caused by type I.–III. meningococci and all except one of these gave positive precipitin reactions, one other becoming negative after the commencement of intrathecal serum treatment. The other eight cases were caused by type II. meningococci and four of these gave positive results. The other three fluids were negative, but in two of these intrathecal therapy had been started before the removal of the fluid. Rake used strong monovalent antisera for his tests and was able to type the organisms by the reactions of the fluids. Separation of types I. and III. was not obtained, but type II. was clearly differentiated. Control fluids from cases of meningitis other than meningococcal did not precipitate with the antisera.

In agreement with other investigators Rake observed that after intrathecal administration of antiserum had been started the precipitin test became weaker and finally disappeared.

The reactions in polyvalent antimeningococcal

horse serum of a series of 103 fluids from cases of meningitis and over one hundred control fluids from cases other than meningitis have been observed in this laboratory in the last six months and the results are generally in agreement with those of Rake. Precipitates appeared in 68 out of 69 fluids obtained from patients suffering from known meningococcal infection. The only negative fluid was removed from the patient at the end of a long convalescence. Out of 17 fluids from cases of meningitis of doubtful origin four were positive and two fluids from cases of suspected tuberculous meningitis were also positive. Most of the cases in this series in which the meningococcus was isolated and typed by agglutination were caused by type I.–III. organisms and gave strong positive reactions with the polyvalent sera used, but fluids from cases of type II. infection identified by agglutination gave a positive reaction even in serum which had been made solely from type I.–III. meningococci.

The technique of the precipitation test was to set up two rows of four Dreyer agglutination tubes and two control tubes. Four different dilutions of the spinal fluid under examination were used—viz., 1/1, 1/4, 1/16, and 1/64—and eight drops of fluid were added to each tube, the front and corresponding rear tube of each row receiving the same dilution of fluid. Into each of the four front row tubes were placed two drops of undiluted polyvalent antiserum and into the rear row of tubes were placed two drops of serum diluted 1/4. Control tubes of undiluted spinal fluid and of undiluted serum were put up in saline. The tubes were shaken and the series was incubated in a water bath at 37° C. for 8 to 24 hours. Only definite precipitation was considered as positive, clouding without precipitation often being present in the first tube even in fluids other than meningococcal. The result was usually complete in under 10 hours.

It was found that a preliminary heating to 56° C. for half an hour did not affect the results, while it enabled the fluids to be cleared more easily by centrifuging and reduced the risk of clouding due to infection by extraneous organisms. Cold storage for months did not affect the precipitinogen content of the spinal fluids.

The results of this series of tests are set out in the accompanying Table.

Table showing the results of Precipitin Tests and Complement-fixation Reactions of Spinal Fluids with Polyvalent Antimeningococcal Sera

Diagnosis and number of fluids examined.		Precipitin.		C. fixation.	
		Pos.	Neg.	Pos.	Neg.
Meningococcal meningitis (proved)	69	68	1	24	1
Meningitis, cause not ascertained	17*	7	10	1	3
Tuberculous meningitis (proved)	9	0	9	0	3
Other meningitis, cause ascertained	8	0	8	0	8
Control cases, other than meningitis	100	0	100	0	20

* Two of these cases were diagnosed clinically as tuberculous meningitis, but neither case was definitely diagnosed bacteriologically at post-mortem.

Rake's technique has been tried in a few cases but the monovalent sera at present available here are not sufficiently strong or reliable for the test.

The main advantage of the precipitin test as a method of diagnosis of cerebro-spinal meningitis is the time saved by its use. Of the cases examined by the technique described above the earliest stage of the disease at which a positive fluid was obtained was the second day and the latest positive was given after three months in a convalescent case. The presence of a precipitate on the addition of polyvalent serum has been reported in a fluid withdrawn as early as eleven hours after the onset of the disease.

In the present series fluids from cases already being treated with intrathecal serum injections gave positive reactions even after several weeks of treatment, although the reaction steadily diminished in that time. This continuance of the reaction after serum treatment is contrary to the experience of most workers including Rake, and it is interesting to note in this connexion that Zozaya, after investigating the properties of the meningococcal carbohydrate, observed that the precipitin reaction was the best guide to the therapeutic potency of antimeningococcal sera.[6] The continued presence of precipitinogens in the spinal fluids after treatment is therefore probably a sign of the inefficiency of the serum.

(*b*) *The fixation of complement by spinal fluids.*—Ginsburg and his co-workers[7] found that the spinal fluid from cases of meningococcal meningitis gave a positive complement-fixation reaction with polyvalent antimeningococcal horse serum. Of 252 clinically positive cases of meningococcal meningitis, of which 137 were bacteriologically positive, 176 fluids were found to give a positive complement-fixation reaction in the first week of the disease and only two bacteriologically positive fluids did not fix complement. Some fifty normal and control fluids gave negative reactions. These authors found that the complement-fixation reaction was more reliable than the precipitin test for the diagnosis of meningococcal infection.

Sixty fluids have been examined at Oxford with results shown in the Table. Of 25 fluids from known cases of meningococcal meningitis 24 gave a positive complement-fixation with polyvalent antimeningococcal horse serum and only one was negative. The tests were set up using the spinal fluid under examination in dilutions of 1/1, 1/8, and 1/32, and the sera used were similar to those used in the precipitin reactions. Both incubator and ice-box techniques have been tried with success. Only one fluid has so far proved anticomplementary.

Provided all the necessary materials are at hand the complement-fixation method is quicker than the precipitin reaction and requires less fluid. It might well be adopted in laboratories where routine Wassermann tests are performed, but in the general hospital laboratory the precipitin reaction will be found simpler and less inconvenient. The sera used in the above experiments were supplied by Dr. G. F. Petrie from the Lister Institute, Elstree, and by Dr. R. A. O'Brien from the Wellcome Physiological Research Laboratories, Kent. All sera were free from preservatives.

SUMMARY

The laboratory diagnosis of meningococcal meningitis from the examination of the spinal fluid can be performed in a few hours by the use of the precipitin or complement-fixation tests.

The causal organism can be typed by the precipitin method if strong monovalent sera are available.

The growth of the isolated organism on immune serum-agar plates may permit early diagnosis of type I.–III. meningococci.

Slide agglutination is sometimes of value in diagnosis.

English monovalent sera are not satisfactory for the diagnosis of type by precipitation, and until better sera are available a combination of the polyvalent precipitin reaction and the growth of the organism on immune serum-agar plates seems to be the quickest method of diagnosis of meningococcal infections from the examination of spinal fluids.

My thanks are due to Dr. Petrie, Dr. O'Brien, and Dr. A. D. Gardner for supplies of sera, and to various hospitals throughout the country for specimens of cerebro-spinal fluids, and also to Dr. A. G. Gibson, of the Radcliffe Infirmary, Oxford, for his kind help.

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PATHOLOGICAL RESULTS OF CÆSAREAN SECTION

By Douglas Lindsay, M.D., F.R.F.P.S. Glasg.

Pathological sequelæ of the Cæsarean section are so common that one is surprised how seldom they are recorded. In my personal recollection there are several cases in which hysterectomy was necessary, within two years of the operation, because of intractable menorrhagia, and one very unusual case in which the uterus became adherent to the abdominal wall, and a utero-abdominal fistula formed through which the patient, to her acute discomfort, menstruated. This last case was also attended by menorrhagia. In each instance the only abnormality found was microscopic—a hypertrophic endometritis—and one was forced to the conclusion that the silk sutures used in the uterine repair were partly responsible.

E. Holland and J. M. M. Kerr demonstrated that some suture more permanent than catgut was essential in the uterine repair following Cæsarean section, and later D. McIntyre introduced a silk reinforced catgut suture which has not yet been proved. McIntyre's suture was introduced, I believe, after his discovery of a large phosphatic vesical calculus in the centre of which was a silk suture used at the operation.

The case I here describe stimulates serious consideration of the suture used and the technique followed.

CASE RECORD

A primipara, aged 40, was sent to hospital just before term on the ground of having a generally contracted pelvis. The true conjugate was approximately 3½ in., the head was floating, and there was an appreciable overlap. Cæsarean section was performed early in labour, and a healthy 7½ lb. child was delivered. Despite apparently ideal surgical circumstances the patient became feverish and acutely ill. On the second day her temperature began to rise, and by the fourth evening it had reached 104·6° F. This pyrexia lasted until the eleventh day, and was accompanied by abdominal pain and tympanitic abdominal distension.

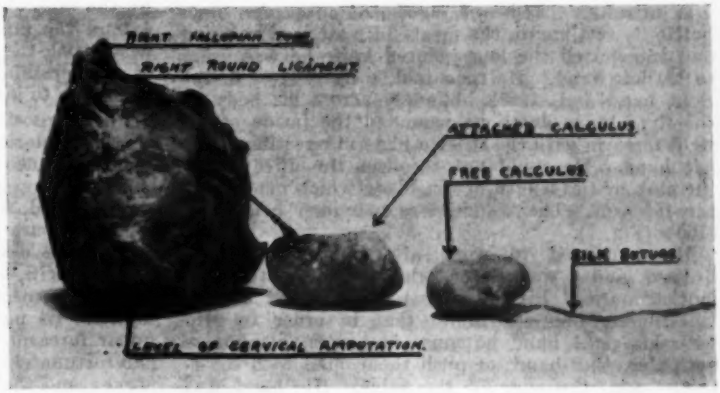
I saw the patient five months after her operation. For three months she had breast-fed her child, but immediately this had ceased menstruation had returned. Before operation the menstrual history was that of a 4-day period with slight loss, recurring regularly at 28-day intervals. The two periods she had experienced before I saw her had been excessive and had lasted for 14 days. Bimanual examination revealed no abnormality. Hæmoplastin, quinine, and calcium were tried without effect.

The periods recurred regularly but still lasted a fortnight, while the loss became heavier. For 12 months I endeavoured to control the loss but was forced to operate when, twice in succession, the period amounted to severe flooding. By this time a change had appeared in the bimanual findings. In front of the uterus was a very hard tumour, feeling exactly like a pedunculated subserous fibroid.

A subumbilical midline incision revealed omentum loosely adherent to the anterior uterine and superior vesical peritoneum. This was simply separated and the old Cæsarean scar was revealed. In its lower end was a silk suture, while from its midpoint another silk suture protruded. This suture passed downwards and forwards to the bladder, into which it entered. The bladder wall at this point was much thickened; as the operation proceeded it was found that the wall was quite three-eighths of an inch thick, and palpable through it was the hard tumour which had been felt per vaginam. The bladder was opened and the tumour released. It was a phosphatic calculus almost the size of a grape, formed on and still attached to the free end of the penetrating silk suture. In the bladder a second calculus was found with a silk suture attached. It was of similar size to the first and looked for all the world like a big drop-pearl ear-ring. Subtotal hysterectomy was then performed. The bladder was closed by Lembert sutures and a continuous catgut; a self-retaining catheter was inserted and maintained for five days, and the patient had a rapid and completely satisfactory convalescence.

It is noteworthy that the patient made no complaint of bladder symptoms, and while she was in hospital after her operation the most searching questioning on this subject failed to produce even a history of frequency of micturition.

The uterus itself was not unduly enlarged. Its walls were just three-quarters of an inch thick. Its inner surface showed the classical gutter of a Cæsarean scar, and in the lower end a silk suture presented through the endometrium.



Anterior uterine wall with silk sutures remaining after Cæsarean section, and resultant calculi.

CONCLUSIONS

Cæsarean section as a means of delivery is the simplest of operations. It is almost impossible to err in the destructive part of its technique. It is abused to-day as much as forceps application, and practitioners who would not attempt such surgical simplicities as the reduction of an intussusception

or the breaking of an adhesion causing an intestinal obstruction, proceed to perform Cæsarean section with ready knife and easy conscience. Too few realise that the real surgery of Cæsarean section begins with the reconstruction. The same factors go to the late results of the operation as go to the early results. Infection, from too hurried preparation, from too frequent vaginal examination, from delaying too long after labour has begun, is the primary factor. All the cases I have seen had pyrexial puerperia. The other elements of importance are the type of suture used, the way the suture is inserted, the number of permanent sutures, the length at which the sutures are cut, and, most important of all, the tying of permanent sutures in a retracted or simply a contracted uterus.

In the case I have described the silk was too heavy. It was of the calibre of a No. 6 catgut. The strand which passed into the bladder was double, and from uterus to calculus measured an inch, which means that, excluding the intra-uterine part and the ends buried in the calculus, that particular heavy silk was 2 in. in length. Again, one suture protruded into the cavity of the uterus and had presumably been passed through all layers, endometrium included. The length of the suture still attached and that found free in the bladder indicated that they had been tied in a uterus which had not retracted. Finally, there was quite an eighth of an inch of loose ends on the one suture at the low end of the scar.

After my own Cæsarean sections, now nearing 200, I have not yet had a case requiring hysterectomy—though others may quite possibly have dealt kindly with some for me. The technique I follow is standard. I never rush the repair of the uterine wall, and my routine sutures are interrupted silks of the calibre of No. 3 catgut and two continuous catgut sutures. The silks, four to six, according to the needs of the case, are sunk to a depth just short of the endometrium; the first catgut takes muscle only, the second takes peritoneum and a bite of muscle. Those sutures are not tied until satisfactory retraction is established. The silks are tied in simple, single reef-knots, pulled just taut enough to threaten to bury themselves in the uterine wall. I cut those sutures myself; leaving them to an assistant or a nurse is the common cause of the raw ends being left too long, and I cut them right up to the knot itself, leaving no loose ends. Finally—and I feel that this is important—I pull omentum over the uterine wound before closing the abdomen.

It appears that the late bad results of Cæsarean section are associated with infection, faulty suturing and over-suturing, either in number, amount of suture, or texture of suture; and that the failure of the surgeon to produce retraction of the uterus before effecting the repair or sinking stitches as deep as the endometrium are also important factors in the production of uterine disorders after Cæsarean section.

CLINICAL AND LABORATORY NOTES

PARALYSIS OF THE RIGHT POSTERIOR INTEROSSEOUS NERVE

BY HAROLD DODD, Ch.M. Liverp., F.R.C.S. Eng.

HON. SURGEON TO THE KING GEORGE HOSPITAL, ILFORD; TO THE ROYAL HOSPITAL, RICHMOND; AND ASSISTANT SURGEON TO THE PRINCESS LOUISE HOSPITAL FOR CHILDREN, KENSINGTON

A BUTCHER'S assistant, aged 18, noticed a bluebottle fly settling on the meat. He stopped working and transferred the long-pointed knife he was using to his left hand. He then took a fly-swatter in the right hand and struck obliquely across his body at the fly. In so doing he wounded the inside of his right forearm with the stiletto-like knife resting in the left hand. He could not recollect the direction of the stab or the length of the blade which penetrated the forearm. The wound was one inch below the elbow (Fig. 1).

He continued to work after the wound was dressed, and a week later, while he was eating, his mother noticed his inability to extend his fingers. Questioning him she found that in order to grip with his right hand he must first open his fingers with the other hand, or push them open with something—e.g., the edge of the table. His hand was in the typical main-en-griffe attitude of an ulnar palsy, and he was also apparently unable to abduct his fingers. On account of this and also of the nearness of the puncture to his ulnar nerve his case was diagnosed as one of ulnar nerve palsy and sent to hospital. However, examination showed no interference with sensation from the elbow to the finger-tips, thus excluding a possible radial, ulnar, or median sensory nerve injury.

Further, when his fingers and thumb were straightened he could completely flex them with full power, and could also abduct and adduct them. This showed that his ulnar and median nerves were intact. Moreover, supination and pronation were complete and equal in power to the opposite hand.

Again (1) he could dorsiflex his wrist, but it had a radial deviation and he was unable to correct this or to incline the hand in the ulnar direction during dorsiflexion; this established interference with his extensor carpi ulnaris, and showed the extensores carpi radialis longior and brevior to be intact (supplied by the musculo-spiral nerve). (2) He was unable to extend the fingers or thumb in any position of the wrist, with the possible exception of slight extension of the terminal phalanges, this movement probably being due to interosseous muscle action.

The diagnosis was thus established—that of division of the posterior interosseous nerve whilst winding round the neck of the radius in the substance of supinator brevis muscle. As all its muscular supply was affected, the division probably occurred before it had separated into its leash of nerves. These supply the extensor communis digitorum, extensor minimi digiti, extensor carpi ulnaris, extensor longus pollicis, extensor ossis metacarpi pollicis, and extensor indicis. In passing from the inner border of the upper forearm to the neck of the radius the knife had fortunately missed injuring the ulnar and median nerves, and the ulnar and radial arteries.

Treatment.—A tourniquet was placed round the arm. The musculo-spiral nerve was "hit off" as it lay in the groove between the branchialis anticus and supinator longus at the level of the external condyle of the humerus. The posterior interosseous nerve was defined and traced into the supinator brevis muscle, where it was found completely divided, the ends being separated by muscle and surrounded by a small hæmatoma. The nerve was defined freely about the division, the ends were trimmed off square with a fresh scalpel and then accurately apposed with the finest silk. A very useful point in the technique of nerve suture was observed—viz., before the nerve was mobilised near each end, two guide knots of the finest black silk were

inserted into its sheath, exactly in line with each other, thus ensuring accurate orientation during the various manipulations to secure apposition. The suturing completed, these knots were cut out, and union took place in approximately the normal anatomical position, thus ensuring rapid resumption of function when regeneration had taken place; otherwise, when "foreign" bundles unite, muscle re-education and re-coördination is necessary.

The limb was placed in plaster with the wrist, thumb, and fingers extended in order to maintain the paralysed muscles "on the slack." He made a good recovery and a year after the operation re-examination revealed only one sign of the nerve injury—namely, slight weakness in power of the extensor carpi ulnaris. This was shown by a little radial deviation of the hand during dorsi-flexion. As a definite active contraction of the extensor carpi ulnaris was palpable, recovery from this unimportant symptom is likely.

Surgically, the result is very satisfactory; but the functional result in the young man is most disappointing. Although he worked for a week after the injury without experiencing marked inconvenience, he has not since returned to his butchering. His complaint is "weakness of the grip." He is able to flex, extend, abduct, and adduct his hand and fingers normally, but he maintains his loss of power to "hold on" to anything. He has now a "functional weakness." He has attended the physiotherapeutic department regularly; all his muscle reactions are normal. The only explanation I can offer is that he is the indulged and only son of a widow, and consequently lacks the encouragement and firmness of a father.

This case is interesting in the following points: (1) The nature of the accident and the unexpected nerve injury, it being so far removed from the site of puncture; (2) the diagnosis and differential diagnosis; and (3) the small amount of inconvenience caused to the patient.

THE LITERATURE

Within recent years little has been written on injury to the posterior interosseous nerve, and the subject is not mentioned in several classical text-books on surgery.

Platt [1] states that injuries of the posterior interosseous nerves in which repair is feasible are exceedingly rare, and that the exposure of the nerve is "an anatomical dissection of great precision and nicety," whilst Souttar and Twining [2] say it is "a very precise dissection"; my experience is in accord with these opinions. Love [3] and Shattock [4] say that the posterior interosseous nerve is occasionally injured as a result of fracture or dislocations of the upper end of the radius leading to wrist-drop. Choyce [5] and Romanis and Mitchiner [6] make similar comments; they add that the nerve may be injured during operations as it passes through the supinator brevis, but do not specify in which operations this injury is to be specially guarded against.

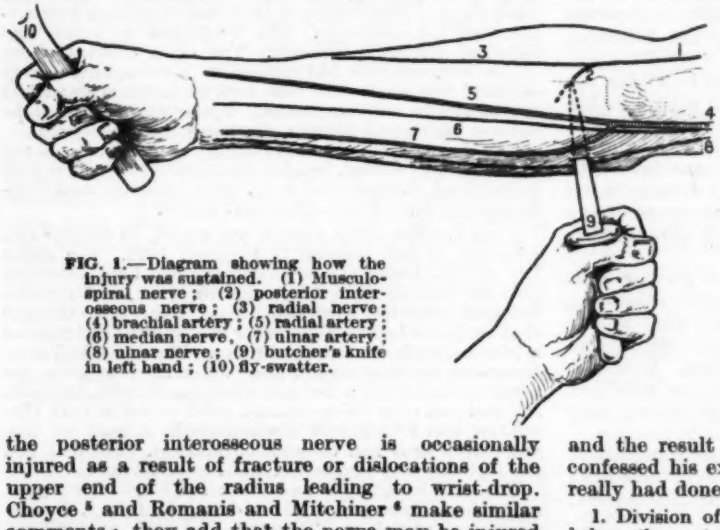


FIG. 1.—Diagram showing how the injury was sustained. (1) Musculo-spiral nerve; (2) posterior interosseous nerve; (3) radial nerve; (4) brachial artery; (5) radial artery; (6) median nerve, (7) ulnar artery; (8) ulnar nerve; (9) butcher's knife in left hand; (10) fly-swatter.

These statements contradict Sir Robert Jones,[7] who says, "the posterior interosseous nerve is occasionally divided by a sharp tool, glass or G.S.W., and that nerve is rarely affected in injuries to the head and neck of the radius." Purves-Stewart and Evans [8] confine themselves to the remark that "isolated injuries to this nerve are rare. Souttar and Twining [2] advise the following *mode of approach*:

"The arm is pronated across the patient's chest. From the centre of the head of the radius the incision runs down the forearm, slightly posterior to the radius. Define the space of cleavage between the extensors of the wrist externally (extensor carpi radialis longior and brevior) and of the fingers internally; at the bottom of this space the supinator brevis lies covered by its fascia whose fibres pass downwards and forwards, although the actual muscle encircles in a transverse direction the head of the radius. Open the space widely and incise the muscle sheath and muscle in the line of the wound at the neck of the radius and the nerve will be exposed."

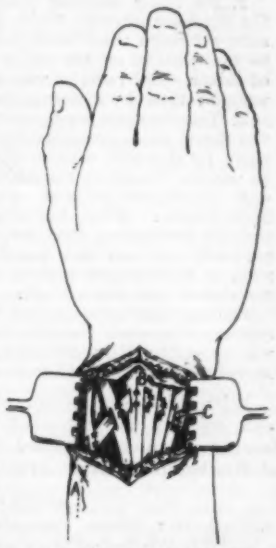


FIG. 2.—Shows the tendon of the flexor carpi radialis (A) passing from the flexor side of the forearm, deviated from its normal line, to transfix the tendons of extensor longus and brevis pollicis, the two extensor tendons of the index-finger, and the extensor tendons of the remaining fingers. The line A–B is in a nearly direct traction line, so that primary contraction of the flexor carpi radialis will extend the thumb and index-finger, whilst still further contraction will extend the remaining fingers through the connexion B–C.

They further add that the origin of the nerve from the musculo-spiral can be defined by separating the radial extensors and supinator longus from their origins, but I would advise lengthening the incision upwards over the external condyle and dissecting up the subcutaneous tissue from the deep fascia until the space between supinator longus and branchialis anticus is exposed, when the nerve is seen deeply in this gap.

Further study of the literature reveals J. B. Murphy's [9] very interesting "pious fraud," staged at the International Surgical Congress in 1914. It is relevant to this case as the same muscles are involved. His patient suffered from the effects of division of the musculo-spiral nerve. To make his demonstration more striking, Murphy "handled the truth a little carelessly," stating that the treatment had been neurorrhaphy, and the result was accepted as excellent. He then confessed his excusable fraud and explained that he really had done the following operation:—

1. Division of the tendon of flexor carpi radialis just below the anterior annular ligament, bringing it out above the wrist. Then he passed blunt scissors up the

forearm for a distance of four inches beneath the skin and on the muscle tendons. Cutting down on the points of the scissors at the outer border of the forearm, at the junction of the middle and lower thirds, he drew the cut tendon upwards from the lower incision.

2. He made another longitudinal incision to expose the extensor tendons above the wrist (Fig. 2), and blunt artery forceps were then passed from it subcutaneously to the incision on the outer border, and the cut tendon of flexor carpi radialis was grasped and drawn into the wound; thus it was now at the back of the wrist.

3. The extensor tendons of the fingers were split, and the flexor tendon was drawn through them and retained there by fine silk sutures (Fig. 2). It was now possible to use the thumb and index-finger continuously extended and contracted without extending the middle, ring, or little fingers. When full contraction of the flexor carpi radialis took place, then full extension of all five fingers resulted. It was not possible to extend the middle, ring, or little fingers without at the same time extending the thumb and index-finger.

The superficial fascia and fat were sutured to prevent adhesions between the skin and the tendons. The hand was immobilised in dorsiflexion for seven to ten days; Murphy's patient could extend his wrist in three days.

With this operation complete restoration of function can usually be expected in four weeks—a great saving of time compared with the year that must elapse before recovery after nerve suture.

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CAVERNOUS NÆVI

BY A. P. BERTWISTLE, M.B. Leeds, F.R.C.S. Edin.

Dr. Dowling's method of treating cavernous nævi by the injection of quinine urethane deserves great consideration, as is shown by the following case.

A girl, aged 9 months, had one nævus involving the whole of the left breast and another, 2 square inches in area, in the buttock which was ulcerated and discharging freely. After consultation with another surgeon I amputated the breast. This was done with little loss of blood by incising at some distance from the tumour. The specimen is in the museum of the Royal College of Surgeons of England (No. 8125.1. Top Gallery, Room 111).

The nævus of the buttock presented greater difficulties, since, apart from its already septic condition, there was fear of fæcal contamination. Just then I read Dr. Dowling's paper[1] and decided to use quinine urethane. Four minims were injected, 1 minim at a time, on eight occasions. The tumour solidified and the ulceration soon subsided. The result, four years later, is a depressed scar.

I feel certain that, had I used the injection method for the breast, a mutilating operation could have been avoided. Radium appears to be the only alternative. Electrolysis and the electric cautery necessitate an anæsthetic; carbon dioxide snow is painful. Excision is so extravagant in healthy tissues that it ought to be relegated to the past together with excision of varicose veins.

London, W.

[1] Dowling, G. B.: THE LANCET, 1929, ii., 1251; see also E. I. Lloyd, ibid., p. 1331.

INFANTILE SCURVY TREATED WITH ASCORBIC ACID

BY ELISABETH SVENSGAARD, M.D.
RESIDENT PHYSICIAN IN THE PÆDIATRIC DEPARTMENT OF THE RIGSHOSPITAL, COPENHAGEN

ON visiting Copenhagen last summer Prof. Szent-Györgyi was kind enough to let this department have some of his ascorbic acid preparation. This substance has been used in the treatment of two cases of infantile scurvy.

CASE 1.—The first patient was a boy, 15 months old at the time of admission to hospital in September, 1933. His whole habitus was markedly rickety, with curved legs, pronounced epiphyseal swelling of wrist- and ankle-joints, and "rosary." When lying down he kept the knees flexed; he was extremely tender to touch and screamed when anybody came near his bed. The was a suggilation below the right knee, but no other hæmorrhages into the skin. The gums, on the other hand, were bluish-red in colour and swollen, in particular around both upper incisors which were loose. The gums bled readily, even on very light touch.

It was stated that the child had not been thriving during the last half year, that his appetite had been poor, and that he had weakened markedly. Previously he had been able to walk with support, but now he refused to stand on his feet. In the last two weeks his condition had been aggravated further by the extreme tenderness to touch; it was also in this period that his mother had noticed a tendency of the gums to bleeding.

In the first months of life he had been given the usual milk mixtures, but from the age of six months he had been kept almost on rice gruel alone, as he had refused to take anything else. This rice gruel was made with whole milk, which had boiled for about 10–15 minutes. The last month before his admission to the hospital the child had been given one teaspoonful of cod-liver oil daily but no other remedies.

We placed the child on a diet of oatmeal gruel (boiled in water) and no other form of food. In addition he was given ascorbic acid or Cevita (the trade name of this preparation), 30 mg. by mouth daily. Even after only three days of this treatment there was a striking improvement of his condition. The tenderness to touch had subsided almost completely. The child crawled about in his bed, after he had refused to move spontaneously the first two days. He was kept on oatmeal gruel and cevita tablets for two weeks. Under this treatment he became bright and happy; the gums became normal.

The diagnosis was verified roentgenologically, the X ray examination showing, besides the rickety features, a very pronounced *Trümmerfeld* zone, with clearings and ring-formations around the epiphyseal nuclei.

CASE 2.—The other patient was a girl, 10 months old, admitted to the hospital in October, 1933. For about two months before the admission she had been cross and peevish, wincing from tenderness to touch, and refusing to stand on her feet when supported. Her mother thought that the gums had become tender too, and she had noticed a bluish discoloration of the gums. The child had been breast-fed the first month, after which she was given the usual milk mixtures; during the last four months, however, she had had only thick oatmeal gruel boiled in milk (the mixture was boiled until it was smooth, at least for five minutes after it had commenced boiling). The diet had not included any vegetables, fruit, or cod-liver oil.

The child looked neat and well cared for, in fairly good nutrition. There was a slight degree of rosary, but no other signs of rickets. There were no skin hæmorrhages, but the gums were swollen and bluish-red in colour. The

child winced when anybody touched her lower extremities. X ray examination showed chisel-shape of the distal end of the ulna and a ring-formed density around the epiphyseal nuclei of the knee. Barley-water test-meal gave normal values for the gastric secretion.

This patient also was placed on a diet consisting entirely of oatmeal gruel (boiled in water) with an addition of 30 mg. ascorbic acid daily (by mouth). Within five days the tenderness to touch subsided, and the swelling of the gums was almost gone. The symptoms of scurvy disappeared altogether after one week of treatment, and the child was given ordinary diet.

Both these children thus recovered in a few days from clinically pronounced scurvy, although they were kept on a diet quite free of vitamin C and had no treatment other than 30 mg. ascorbic acid daily.

In THE LANCET of Sept. 9th, 1933, P. Schultzer reported a case of scurvy in an old man, cured by administration of ascorbic acid—as far as I know, the first cure of this kind reported in the literature. This patient was a man of 68 years, suffering from alcoholic gastritis with achylia. His daily diet had been very deficient in vitamin C. He was given intravenous injections of 40 mg. ascorbic acid, and his scurvy subsided rapidly under this treatment.

MEDICAL SOCIETIES

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY

AT a meeting of this society held at Liverpool on Dec. 15th, 1933, Prof. A. LEYLAND ROBINSON, the president, delivered an address on ancient and modern methods of treating

Obstructed Labour

There were four distinct epochs or phases, he said, through which the present treatment had evolved. During the first, which extended from the dawn of civilisation to the time of Ambroise Paré, cephalic version and embryotomy were the methods of choice in dealing with mechanical obstacles. The second epoch, which began with the teaching of Paré and terminated with the publication of the forceps, was dominated by the teachers of the French school, who introduced and practised podalic version and accouchement forcé. The third epoch coincided with the use of the forceps which had been invented by Peter Chamberlen at the end of the sixteenth century, but remained a family secret for nearly a hundred years, and only came into common use in England when Chapman published his book in 1773. The fourth epoch, the present age, dating from about 1880, was initiated by the discoveries of Pasteur and Lister, whose work made Cæsarean section comparatively safe, and thus paved the way for the safe employment of surgical methods of delivery. In discussing the different methods now in use, the President emphasised the importance of delivering the patient at the first attempt. He showed from an analysis of a large number of cases abstracted from the reports of the British maternity hospitals that repeated attempts at delivery greatly increased the risk of death. The "failed forceps" type of case was also found amongst patients submitted to induction, version, and Cæsarean section, and such failures, which might be grouped together as "the failed first attempts," contributed largely to the avoidable fraction of the maternal mortality. These failures, he thought, were due to two main causes: (1) lack of knowledge concerning the best method of overcoming a mechanical difficulty, and (2) want of judgment in choosing the right time for surgical interference. The present methods and results were undoubtedly greatly superior to those of the eighteenth and nineteenth centuries, but much could be learnt from the great obstetricians of the past, and especially from their knowledge of the resources of natural delivery.

Gynæcological Cases

ACUTE HYDRAMNIOS WITH FŒTAL TERATOMA

Mr. J. ST. GEORGE WILSON described a case in which the patient, a 2-gravida aged 40, complained of increasing abdominal discomfort and pressure at the thirty-second week of pregnancy. There had been marked increase in the size of the abdomen during the previous four days. Abdominal examination showed the uterus to be very tense and ballottement was just possible in lower right side. Radiography revealed a fœtus at about the twenty-sixth week, apparently normal. An attempt was made to relieve the intra-uterine pressure by tapping through the abdominal wall, but the attempt was unsuccessful. Perforation of the membranes through the cervix was carried out and the liquor evacuated, followed by normal labour, the fœtus being delivered normally with the tumour leading. There was a swelling about twice the size of the fœtal head situated on the front and sides of the neck. On section the tumour was seen to have a sagittal firm attachment to the base of the tongue and to the front of the larynx. Microscopically there were areas of embryonic cartilage in one place showing ossification, and also a large amount of embryonic nervous tissue. Mr. Wilson thought it was probably a thyroid tumour and a teratoma.

SARCOMA OF THE UTERUS

Dr. R. WATSON and Mr. WILSON described three cases of sarcoma. The first patient was a multipara aged 71, who had a fungating mass protruding through the cervix; microscopical examination of a fragment showed it to be sarcomatous. Subtotal hysterectomy was performed—total hysterectomy being impossible—and it was found that the uterus was infiltrated with a round-celled sarcoma. Eighteen months later a small polypus developed in the cervical stump and on removal proved to be sarcomatous; this has been treated by radium and deep X ray therapy.

The second patient was aged 36. There had been hæmorrhage since the birth of her sixth child nine months before, and on examination the uterus was found much enlarged, with a sloughing tumour protruding through the cervix. Examination of a portion showed that it was a mixed-cell sarcoma. Operation was refused, but the patient returned two months later and total hysterectomy was performed. On the second occasion a small nodule was found in the perineum, which on removal showed a spindle-celled sarcoma. X ray treatment was refused, and on her return eight weeks later there were secondary deposits in the lung.

The third specimen was from a patient aged 27. She was a multipara and had been suffering from menorrhagia and metrorrhagia for four months. Vaginal examination showed the uterus to be enlarged and a polypoid mass protruding through the cervix. The pathological report on the growth stated it to be a necrotic angiomatous type of polypus with no evidence of malignancy. Ten months later she returned with a history of renewed bleeding and a mass was again found protruding through the cervix, so total hysterectomy was performed. The growth was a round-celled sarcoma.

EPITHELIOMETRA

Mr. WILSON and Prof. J. H. DIBLE described a case in which the patient, an 8-para aged 56, had been treated with radium for early carcinoma of the cervix, Heyman's technique of 126 mg. of radium for 20 hours being employed. This was followed by deep X ray therapy. Two years later she returned because of pelvic pain, and though the cervix could not be palpated owing to obliteration of the upper end of the vagina, the uterus was felt to be enlarged on rectal examination. Under anæsthesia it was impossible to define the cervical canal. Hysterectomy was performed, and during operation the uterus was punctured and a quantity of thin fluid escaped into the peritoneal cavity. Microscopical examination of the uterine wall showed the whole uterine cavity to be lined by squamous epithelium.

REVIEWS AND NOTICES OF BOOKS

Nature and Treatment of Amentia

By L. PIERCE CLARK, Chief of Advisory Board of Research at Letchworth Village for the Feeble-Minded, Chief of Department of Neurology and Psychiatry, New York City Children's Hospitals and Schools. London: Baillière, Tindall and Cox. 1933. Pp. 306. 12*s*. 6*d*.

THIS work dealing with mental defect from the psycho-analytic point of view is described as a pioneer attempt. It is appropriately dedicated to Sigmund Freud. Mental development in general is described in psycho-analytic terms and the problem of defect is considered in this light.

It may be questioned whether the conception of mental defect as a "failure to advance beyond the earlier primitive forms of identification, those still closely allied to the actual physical ingestion of the mother" is more intelligible or helpful than the usual description of a defective as one who is less able to grasp the abstract than the concrete. Dr. Pierce Clark is, however, modest in his claims. He does not suggest that any form of psycho-analytic treatment can remove fundamental causes of amentia or do more than develop the innate potentialities. The limits of faculty are defined by inheritance. "The great practical question," he says, "is how to foster development of various necessary capacities up to the full level of their possibilities." He is obviously thinking rather of the limitations placed upon growth by emotional conditions than of those arising from intellectual incapacity. The stable type, less hampered by emotion, is able "to absorb the substance of the limited identification he does make" and "attains a comfortable balance between the demands of the ego ideal and his actual possibilities." For these, Dr. Clark admits, psycho-analysis may be superfluous. With the unstable, however, "narcissistic emotions so overbalance the ego's actual ability that gratification can only come from fantasy or other forms of substitution for reality." It is, in short, for the removal of emotional inhibitions that the author claims a value in psycho-analytic procedure; he calls attention to the necessity for more study of the emotional hindrances in the way of the defective than is usually given. There seems to be no reason why child guidance clinics, for example, should not include in their scope at least the feeble-minded child of higher grade. To such a child the satisfactory adjustment of his relation to his environment is surely an indispensable condition of progress.

Dr. Clark does not criticise the present basis of education of the feeble-minded—i.e., concrete teaching with variety of appeal and frequent repetition—but rather aims at supplementing the methods now applied. Unfortunately, his suggestions do not go very far and some of them will probably be inacceptable to many of those experienced in the training of defectives. It may be questioned, for instance, whether his suggestion that the ego be left free to try out its own impulses and make its own restrictions is one which can be freely applied to the feeble-minded. He does, it is true, admit that the teacher must take some active part in securing recognition of social standards; his insistence on maintaining the teacher's attitude as one of friendly guidance and not of punishment would be generally regarded as superfluous, so well recognised is this need.

This book is well written, systematic, and logical in arrangement and sequence, and the more theoretical matter is illustrated by full description of actual cases of defect of differing grades. Whether psycho-analytic procedure will achieve all that Dr. Pierce Clark anticipates from it seems to us doubtful, though we share the admiration expressed by Dr. Ernest Jones, who contributes a brief foreword, of his assiduity and enthusiasm.

Migraine: Diagnosis and Treatment

By RAY M. BALYEAT, M.A., M.D., F.A.C.P., Associate Professor of Medicine and Lecturer on Diseases due to Allergy, University of Oklahoma Medical School; Chief of the Allergy Clinic, University Hospital. London and Philadelphia: J. B. Lippincott Company. 1933. Pp. 242. 12*s*. 6*d*.

THIS book contains a good review of the more important features of migraine. Dr. Balyeat deals with this common disorder chiefly as a manifestation of allergy. He discusses the hereditary factor in migraine with reference to the inheritance of allergy, and concludes that only the ability to become sensitive is transmitted and not the specific form of allergy. Although Dr. Balyeat has investigated 65 cases of headache proved to be due to food hypersensitiveness by dermal and intradermal tests, he does not state what proportion of sufferers from migraine are hypersensitive to food substances. The common food offenders, to use Dr. Balyeat's term, are milk, wheat, egg, apple, onion, legumes, nuts, beans, chocolate, fish, beef, pork, and shell (sea) foods. Other causative factors receive adequate consideration, and the author makes the interesting observation that patients whose attacks of migraine are precipitated by some extraneous factor, such as eye-strain, and who are also hypersensitive to a food substance, may cease to get headaches when exposed to eyestrain if the offending food is excluded from their diet. Dr. Balyeat gives a good account of the symptomatology of migraine, though he does not mention certain of the rarer manifestations—for example, permanent hemianopia. In discussing its pathogenesis he favours the theory that the symptoms are due to localised cerebral œdema rather than to cerebral vascular spasm. The recognition that headaches other than typical migraine may be due to allergy is useful. The section dealing with treatment is very good. The book concludes with detailed reports of 53 cases of allergic headache.

This book can be commended to all who have to treat sufferers from migraine. That migrainous headaches are allergic in some cases seems proved, but Dr. Balyeat is no faddist and he provides a sane and comprehensive review of the whole subject.

Bright's Disease

By J. NORMAN CRUICKSHANK, *M.C.*, M.D., D.Sc., F.R.F.P.S. Glasg., M.R.C.P. Lond., Senior Assistant to Muirhead Professor of Medicine, University of Glasgow; Assistant Physician, Glasgow Royal Infirmary. Edinburgh: E. and S. Livingstone. 1933. Pp. 208. 10*s*. 6*d*.

MONOGRAPHS and papers on nephritis published during recent years fall in the main part into groups according to the country of their origin. Our own workers have shown a tendency to supply either new classifications evolved from the old British

terminology or expositions, not always well balanced, of the modern German school of thought. Work emanating from France usually embodies a considered apologia for the views of the late Prof. Widal, the arguments in his defence becoming yearly more eloquent and less plausible. From America there have come some notable monographs which have been reviewed in these columns from time to time, and it is the fact that American writers appear to be able to extract much of the best from each school of thought on this perplexing subject without wholly subscribing to any of them.

Dr. Cruickshank gives the English reader an exposition of that general classification of nephritis which at the present day seems to fit in closely with our clinical and pathological knowledge, for he founds his book on three main types: (*a*) an exudative or hæmorrhagic group, (*b*) a degenerative group (the nephroses), and (*c*) a vascular or ischæmic group (the nephroscleroses). He follows in the main the German school, particularly the published work of Volhard and Fahr, and indeed he acknowledges his gratitude to Prof. Fahr for giving him access to his collection of histological preparations. The classification suggested by Dr. Dorothy Russell and those adopted by Van Slyke and Addis in America, together with that of Prof. R. Muir in this country, are set out in a long appendix, where we find no mention of the study of nephritis published this year by Dr. John Gray.

The student of clinical medicine will regret that Dr. Cruickshank has not given any illustrations of the chief histological appearances in renal disease whilst devoting a considerable proportion of the text to verbal descriptions of these changes. The chapter dealing with the nephroscleroses makes no mention of the pioneer work of Gull and Sutton. Emphasis appears to be thrown by the author on the renal aspects of the general sclerotic process more than on its other peripheral effects. It is difficult to agree with some of the clinical statements—e.g., on page 46, that the terminal stages of chronic diffuse nephritis may be indistinguishable from those of advanced mitral disease; nor does he emphasise sufficiently the frequency of death from acute left-sided cardiac failure in cases of nephritis with hypertension, a clinical picture with which too many students are unfamiliar.

The chapter on uræmia fails to convey to the reader that clear distinction between the symptom-complex of terminal renal failure and that produced by the extreme cerebral manifestations of hypertension which have been often described in recent years under the titles of "uræmia" and "pseudo-uræmia." The statement on page 160 that the blood pressure is high until the onset of cardiac failure, and that the heart and blood-vessels show signs of a continued strain of high pressure and intoxications, obscures the well-known fact that uræmia may occur with no alteration whatever in the blood pressure; and the statement on page 161 that the associated anæmia may be either hypochromic or hyperchromic is either misleading or insufficient. On the other hand the chapter on œdema contains a good critical survey, lucidly written, of the various factors concerned, and if the disciples of Epstein and Govaerts feel that Dr. Cruickshank's summary of their views is not entirely enthusiastic they should be satisfied with the conclusion which he draws at the end of the chapter. The book includes a chapter on tests of renal function which begins with a clearly worded warning of the limitations of such laboratory methods. This chapter is supplemented, however, by an appendix, almost as long as the chapter, giving technical details of some of the methods employed for estimating the functional efficiency of the kidney.

We have felt it necessary to set out in some detail the reasons why, in our view, Dr. Cruickshank's monograph, in spite of its attractive size and format, does not meet the need of the practitioner for a straightforward and simple outline of Bright's disease. In many places he seems to have sacrificed accuracy in the attempt to achieve simplicity, when the result may be misleading.

The Ecology of Animals

By C. ELTON, Director of the Bureau of Animal Population, Oxford University. London: Methuen and Co., Ltd. 1933. Pp. 97. 3*s*. 6*d*.

WE cannot defy history, propriety, and the Oxford lexicographers so far as to follow the author in the mis-spelling of his key word, but we can heartily commend this excellent little book to those who want to know the present status and aims of animal ecology, which may be described as natural history minus systematics and plus quantitative methods and a search for reasons. Mr. Elton investigates the biology of animals as wholes, how they live and move and have their being and their relationships to other animals and plants. In particular, at present he is concerned with food cycles—what animals feed on and what they are the food of—and with numbers—plainly a prime necessity for further investigation. The periodic variations in numbers, in which Mr. Elton himself has done such distinguished work, are of great interest and determine many practical matters such as plagues of locusts and the price of fur coats. And it is very surprising to read that there are only about 8000 herons in England, for to ordinary observation this is hardly an uncommon bird. A great problem in which no progress has been made is the ascertainment of causes of death in wild animals; for this the zoologists need the coöperation of pathologists, and we hope it will be forthcoming. The index is poor.

Pulmonary Tuberculosis in General Practice

By ANDREW MORLAND, M.D., M.R.C.P., Resident Physician, Mundesley Sanatorium. London: John Bale, Sons and Danielsson, Ltd. 1933. Pp. 113. 2*s*. 6*d*.

THIS book is one of a series of pocket monographs on practical medicine, the object of which is to provide information that the practitioner may require at a moment's notice—a book to be consulted on the way to a case, or, indeed, at the patient's actual house. Such a manual should not be merely a condensed text-book, though it may follow traditional text-book lines; it must give advice for dealing with emergencies. Dr. Morland has fulfilled these requirements in respect of pulmonary tuberculosis with considerable skill, although occasionally the reader may get a shock, as when he reads (on p. 3) that "although the consumptive adult is the most important source of infection for children, it is doubtful if one adult (who has passed through the usual childhood infection) ever catches phthisis from another." The chapters in the first (general) section of the book are all helpful, with the exception, perhaps, of that on physical signs. It would seem that the effort to condense it into four pages has been too

difficult a task. The last paragraph, headed "pleuropericardial friction" (which, incidentally, we consider rare rather than "common"), contains a jumble of information which apparently would not fit elsewhere.

The beginning of the second section, which deals with treatment, contains valuable advice on rest, exercise, fresh air, and climate; later chapters on collapse treatment, special treatment, after-care, and the mental aspect are equally well written. We should like to have seen more than four pages devoted to symptomatic treatment. This is where definite instructions, with plenty of prescriptions, are necessary. The practitioner will not derive much help, for instance, from the paragraph on hæmoptysis. It would have been better, we think, to begin by stating the three main objects of treatment: (1) to decrease the blood flow in the lungs, (2) to increase the coagulability of the blood, and (3) to clear the tubes; then to give, in tabular form, the several methods of attaining these objects—a line or two would be sufficient for each; and finally to add a note on remedies which, while beneficial in one way are harmful in another. For instance, morphia decreases the blood flow but checks clearance of the tubes. A method of presentation such as this would help the practitioner to treat rationally.

On the whole it will be agreed that Dr. Morland has produced a book which contains a great deal of excellent advice in a convenient form.

Infantilism

By E. APERT, Physician to the Hospital for Sick Children, Paris. Translated by R. W. B. ELLIS, M.D. London: Martin Hopkinson Ltd. 1933. Pp. 117. 7*s*. 6*d*.

THE symptom of infantilism is one which is liable to appear in such a variety of morbid conditions that a book devoted to its consideration covers a wide field of general medicine. The author gives an historical review of the manner in which the term has come to have its present application, and shows that not only is the condition distinct from dwarfism (even existing in some cases in association with gigantism), but that a true infantilism may be said to exist before the normal age of sexual maturity has been reached, when the bodily proportions and development are those appropriate to an earlier age-period than that of the patient's actual years. He describes in detail the more or less well-established types which have been recognised—thyroid, the several pituitary types, renal, cœliac, progeric, hepatosplenic, and Gandy's retrograde infantilism, in which after having reached maturity normally the patient regresses to what is practically a prepubertal state. Cardiac infantilism he regards as a misnomer; Dr. Apert discusses the doubtful "suprarenal" infantilism, and the occurrence of infantilism in the course of a variety of other debilitating conditions. Whilst the book is written essentially from the point of view of personal clinical experience rather than as a review of the whole literature, it provides the most thorough and well-informed monograph on the subject that has appeared since the publication of Mr. Hastings Gilford's "Disorders of Post-natal Growth and Development" in 1911. The section on treatment is practical and not unreasonably optimistic. Dr. Apert has been fortunate in his translator, who has succeeded in conveying his exact message in smooth idiomatic English.

Surgical Anatomy

By C. LATIMER CALLANDER, A.B., M.D., F.A.C.S., Assistant Clinical Professor of Surgery and Topographic Anatomy, University of California Medical School. With foreword by DEAN LEWIS, M.D., D.Sc., LL.D., F.A.C.S. London: W. B. Saunders Co., Ltd. 1933. Pp. 1115. 63*s*.

THIS book is the completed result of some 12 years' work, planned originally by the author in conjunction with his father, the late Dr. Cyrus N. Callander, but in his hands alone for the last three years. He deserves congratulation on the fruit of his labours, which takes the form of a large volume of more than 1100 pages, with nearly 1300 illustrations. Its object, the application of regional anatomical facts to surgical proceedings and pathology, has been achieved. Among the merits of the work is the anatomical accuracy of its text. It is really a work on surgery, of course, and good surgery, based, as such surgery must be, on sound anatomical information. The neurological sections perhaps stand out, in a work of general excellence, for their special clarity and reliability. Our one criticism is of the title, "Surgical Anatomy," which, though in common use, has little meaning: the subject matter of a book must be either anatomy or surgery. If the anatomy is applied by the surgeon it forms an integral part of his surgical practice: it is applied anatomy, or anatomically directed surgery. The term is, however, well established, and its merits or demerits will have little effect on the popularity of Prof. Callander's book, for which we anticipate a great success.

A Text-book of Biochemistry

For Students of Medicine and Science. Fourth edition. By A. T. CAMERON, M.A., D.Sc. Edin., F.I.C., F.R.C.S., Professor of Biochemistry, Faculty of Medicine, University of Manitoba; Biochemist, Winnipeg General Hospital. London: J. and A. Churchill. 1933. Pp. 556. 15*s*.

Prof. A. T. Cameron, though a prolific writer of text-books on biochemistry and allied subjects, never allows his material to become stale or to deteriorate at all from the high standard he sets himself. This book, which has reached its fourth edition within five years, is completely up to date and contains, among other subjects, excellent accounts of the recent work on hormones, vitamins, and metabolism.

Fundamentals of Biochemistry in Relation to Human Physiology

Fourth edition. By T. R. PARSONS, B.Sc. Lond., M.A. Cantab., Sidney Sussex College. Cambridge: W. Heffer and Sons, Ltd. 1933. Pp. 435. 10*s*. 6*d*.

THIS popular work was first published in 1923 as a very rough outline which provided the basis of a knowledge of physiological chemistry for many people who possessed no substantial knowledge of organic chemistry. In subsequent editions it has inevitably become more and more complicated, and the present volume gives a very good general view of biochemistry. The style has not been altered and remains easy, almost conversational, in character. We were unable to find any reference in the index to recent work on the sex hormones; in the next edition this important branch of biochemistry will demand attention.

THE LANCET

LONDON: SATURDAY, JANUARY 6, 1934

ABOUT PREVENTIVE MEDICINE

LET us imagine a symposium—a company of doctors and laymen—discussing their reactions towards the term preventive medicine. Their contributions to the debate will result, with varying gestures of impatience or flares of enthusiasm, in producing arguments which must follow the usual lines. The individualist among doctors will seize the opportunity to abuse the public health service, seeing, or professing to see, nothing in it but an opportunity for official rhetoric and the institution of by-laws. He will dwell on the time-consuming obligations to fill up forms and render explanations of his actions—and these for the information of men whom he may consider less competent than himself. The theme will be elaborated with allusions to the direct harm which has resulted through the interference of local authorities—among the examples given here being the unnecessary tonsillectomies proposed by a school medical officer, the difficulties incurred in obtaining employment by a man who has once been notified as tuberculous, the syphilophobia engendered by notices in public lavatories. Other contributors to the debate will include the doctor who cares for none of the things prized at welfare centres, and he in his turn will find himself opposed by a colleague round whom the practical activities of such a centre may revolve, and by any in the room charitably interested in the promotion of these movements. One, probably a business man, among the company will observe, in perfect good faith, that while the livelihood of the family doctor is allowed to depend on attendance on sick people he can hardly be expected to coöperate willingly in the prevention of sickness. The popular fiction will be repeated that the Chinese pay the doctor when they are well, understanding that he will keep them from becoming ill, as he will not be paid for his services to them when sick. And no one will point out that such a system, if adopted on a large scale, would constitute not an instance of Chinese eccentricity but a practical form of medical insurance.

The opening moves having been duly made and countered, the game threatens to proceed to a stalemate. But it is enlivened by the enthusiast who distinguishes, following RICHARD CABOT,[1] between a wholesale and a retail conception of medicine. The former requires a preoccupation with the interests of the community at the expense of the individual, an attitude which seems antagonistic to that of the private practitioner, and the conflict between these outlooks is perhaps inherent in the respective functions of public health officer and family doctor. The latter's claim constantly to practise preventive medicine in regard to his patients must, however, be admitted, once his coöperation is enlisted. Every measure used to promote cure is also designed to prevent either direct extension of a local lesion or invasion of the circulation by micro-organisms or toxins, or sequelæ occurring in a different system of the body which experience has shown to be vulnerable in particular associations. This regard for the principles of prevention is inculcated to-day in all our medical schools. The young student learns that the disappearance of a primary sore or the reduction of a parotid swelling is not enough; treatment must be directed to the prevention in one case of paralysis, in the other of sterility, while the general protection of the public from infection with syphilis or mumps has to be taken into account; the healing of a fractured femur, again, gives little satisfaction unless the patient is helped to escape a fatal pneumonia. What then is the justification for the criticism, not infrequently heard, that the practitioner takes little interest in preventive measures and requires a new orientation? It lies in the fact that the doctor's intervention or advice is first sought when the initial lesion or infection is already established, and that, broadly speaking, he appears to be satisfied with this position. He is disposed to cope with physical misfortunes as they occur and to let others seek to prevent them if they can. This is not surprising, since he has been trained on the assumption that the doctor's main duty is to diagnose and then treat disease, and to this end his hospital years have been used in giving him the widest possible clinical experience. Many of his teachers still hold that for the student to spend more time in the study of what is known of preventive medicine at the expense of observation of sick people would be to waste opportunities which will not recur. They point to the high clinical tradition of British medicine and to the encroachments on ward work which already threaten its survival. But another school of thought is gaining ground which holds that it is the duty of the family doctor to help his patients to maintain health as well as to regain it. At the Centenary meeting of the B.M.A., in his presidential address to the section of public health, Sir GEORGE NEWMAN traced the development of insurance legislation during 20 years, and showed that the Insurance Acts brought the means of prevention as well as the treatment of disease under the control of the practitioner. The interdependence of preventive and curative medicine is not sufficiently recognised; neither are our students trained nor our institutions conducted with any emphatic stress upon it.

But there is evidence of a general demand for codes of healthy living which, if the doctor is not prepared to supply, the public will seek from sources less reliable. The first step to meet the demand must be to demonstrate to the sceptic among doctors that a considerable body of established fact exists from which to select information on preventive medicine suited to the needs of the public. No better way can have been devised to achieve this object than

[1] Training and Rewards of the Physician. London, 1918.

the experiment of throwing open to practitioners as well as to students the course of lectures inaugurated this session at King's College Hospital, London, emphasising the preventive aspects of disease. In order to give to these lectures a wider audience than could be accommodated at the hospital (where the attendance has exceeded all expectations) we have availed ourselves of the privilege granted by the authorities of following the course, and have been able to arrange to publish each lecture upon its delivery. The lectures already published have dealt with the following subjects: the prevention of diseases liable to attack infants, very young children and children of school age; the carriage of disease by water and milk; the proper principles of ventilation and the need for sunshine and appropriate clothing; diet in general and the vitamins and organic salts in particular; and the prevention of maternal mortality. The series will be resumed after the Christmas vacation on Jan. 11th, when Prof. R. TANNER HEWLETT will speak on prevention of diseases conveyed by food, to be followed on Jan. 18th by Prof. MAJOR GREENWOOD on epidemiology and its lessons. The list of subsequent fixtures on another page shows the scope of the series as a whole, when certain omissions in the programme may be noted. But no one could fairly contend that the principles of preventive medicine as here summarised prove to be so nebulous as to make the public demand for guidance premature. To what extent the family doctor will himself assume the rôle of guide depends more on his temperament than on his erudition, but it is clear that unless he is fully equipped to do so his authority will suffer.

THE PORTAL OF MENTAL TREATMENT

A GREAT psychiatrist once said that it is the treatment which the patient receives during his first hour in the mental hospital that is the most important contribution to his recovery. Two recent happenings suggest more than a doubt whether this precious hour is being used to the best advantage. A few days ago, through a mistake in an address, a sane woman was taken by force to the observation ward of a Middlesex hospital; she protested vigorously that she was not the person who was wanted, but her protests were unavailing. About the same time a special inquiry was being held at Birmingham into the sequence of events which preceded a verdict of "guilty but insane" on a charge of murder at the local assizes. In this case the accused man had been transferred from the general hospital to the observation ward of the public assistance hospital because he was thought to be suffering from delusions, yet he was soon afterwards released at the request of his wife. There are at least three points in which the two cases present different sides of the same problem. The first is the ease of believing that a person is queer or deluded, or neither queer nor deluded, if there is in our minds some important premise that is never questioned. The second is the ease of getting into and then of coming out of the mental observation ward. The third is the question of coöperation between those who have to diagnose and treat cases of mental illness.

The misleading premise in the mind of the public assistance officer in the first case was that a woman in a house by herself was to be taken to hospital. The person taken fulfilled the particulars he had been given; she acted as anyone would have acted in similar circumstances and thereby increased the suspicions of her visitors. The misleading premise in the Birmingham case was that a morose man who had been unemployed for months might be so disgruntled as to attack attendants and require the padded room. That the man had given false information about casual employment added to the tenacity with which this premise was held; but it could hardly have been maintained if all the patient's statements and actions in the general hospital had been surveyed in the light of knowledge that delusions seldom disappear with dramatic suddenness, though suspicious patients may be as clever as criminals in hiding them. Surely in cases of this sort a visiting psychiatrist could be of help in aiding the medical officers to form an opinion whether a patient should be discharged or retained on certificate. Despite the protective clause of the Mental Treatment Act of 1930 the practitioner remains conscious that certification has an awkward way of repercussing on him, and an expert opinion gives a useful feeling of security both to him and to the public. In his assessment of the prospects for the patient the consultant would require all the relevant information; and in the case quoted the social service worker could have given him all the facts which the Commissioner of Assize finally exposed. The very natural pleading of the patient's wife would have been more readily resisted if the medical officer had known he had easy access to psychiatric opinion. In the case of mistaken detention, it is likely that in future no officer will remove to an observation ward a person living by him/herself unless a relative or a medical man is also present. While false premises may lead to group misconceptions, a delusion is an individual's false belief which is never shared in toto by others.

Both happenings may, as we have suggested, arouse doubts in the minds of the susceptible as to how far the medical profession considers all aspects of the sufferer when it deals with mental illness, or how far when faced with mental abnormality the practitioner and the law begin to react without due consideration of the best feelings either of patients or of their friends. If it is realised that the treatment which the patient receives during his first hour in the mental hospital is a large factor in his recovery there may be needed a greater willingness, in his interest, to speak unwelcome truths and do unpopular things. This is as essentially a friendly act as is the provision that transference to hospital should only be carried out by senior nurses and attendants who are skilled in arousing the sympathies of the relatives, and thus combating in some degree the stigma which the latter feel the proceedings are intensifying. The decision to permit a patient to leave an institution in which satisfactory care is being provided is at least as grave in the case of someone suffering from mental

disorder without overt clinical signs as in the case of many forms of physical disease when the symptoms are in abeyance.

DRAINAGE IN ACUTE APPENDICITIS

IT is illuminating that the surgical treatment of a condition so common as appendicitis should not yet be standardised; it is a demonstration of the difficulty of applying exact methods to clinical medicine. Last year an attempt was made by G. H. COLT and MARGARET MORRISON [1] to assess the value of drainage in operations for acute appendicitis and of the two incisions usually employed, the McBurney and the Battle. The material was 1413 cases, and it might seem easy to reach conclusions from so many. But the investigators' chief observation was that the superficial study of such a series may be very misleading. For instance, from the first table they publish they show that the mortality of drained cases is nearly ten times that of undrained cases, and the relative immunity of the undrained is seen in all the clinical varieties of the acute disease. Yet when these figures were submitted to a statistician it was found that support for the practice of complete closure of the abdominal cavity was not warranted; indeed, "any such collection of heterogenous data is not capable of mathematical analysis." Such judgments are disappointing, but it is well to be reminded that conclusions drawn from massed statistics from the practice of many different surgeons working under very different conditions may be completely void of value. The number of variables in such an apparently simple problem as this is so great and so far beyond control that the clinician is probably best guided by impressions he has gained by careful observations in his own experience.

This question of drainage is of course of great practical importance. About 20 years ago A. E. BARKER, of University College Hospital, strongly advocated suture of the abdomen without drainage for a large proportion of operations for acute appendicitis. He had many followers, but it is significant that the fashion of non-drainage died out later. Now it has been revived, and much enthusiasm for the abolition of drainage in appendicitis has been expressed by a number of experienced surgeons, some of the first rank. An interesting contribution lately made to the subject is a series of 244 cases of peritonitis treated without drainage analysed by A. J. TRINCA.[2] Of these, 213 were due to appendicitis, and among them were three deaths only (1·4 per cent.). Also there was but a single residual abscess—a fact which is remarkable, for it is noteworthy that various series of secondary pelvic abscesses after appendicitis have been published from clinics where drainage is not employed. TRINCA, however, declares that the presence of a drainage-tube in the pelvis actually increases the likelihood of a residual abscess developing. Again, F. CHRISTOPHER and W. K. JENNINGS [3] hold that drainage increases the mortality-rate in non-perforated cases. But when they tried to find some relation between the time occupied in the operation and the mortality-rate they were most impressed by the importance of skill, judgment, and delicacy in handling the tissues, and their emphasis on this goes some way towards invalidating their other conclusions.

Many surgeons, whilst well aware of the marvellous powers of combating infection possessed by the peritoneal membrane, are reluctant to abandon the drainage-tube altogether. They recognise the unwisdom of the days, happily passed, when three or four tubes were left in the different fossæ of the peritoneal cavity after every operation for acute appendicitis. The impossibility of draining the general cavity has been amply demonstrated; nevertheless accumulated clinical experience, which cannot be ignored, does leave an impression that a single drain down to the bottom of the pelvis lessens the incidence of a secondary abscess there. On the other hand, intestinal obstruction seems to be less common where primary suture has been done. As usual in such matters an intermediate course appears best. Undoubtedly, where diffuse peritonitis is present, except in young children, primary suture may be employed with advantage provided there is no local infective focus left, no raw or bleeding surface, no sloughy appendix bed, no necrotic tissue, or other doubtful site remaining. Such areas must always be drained. Whether or not a tube should be used requires a certain experience to decide. It is better to leave a tube in too often than too seldom. An attempt to drain the free peritoneal cavity should never be made. It is futile, unnecessary, and harmful.

[1] Brit. Jour. Surg., 1932, xx., 197.
[2] Med. Jour. Australia, 1933, ii., 465.
[3] Amer. Jour. Surg., 1932, xviii., 16.

MISSIONARY HAZARDS

To the layman the "occupational risk of missionaries" calls up visions of poisoned spears and cannibals, and that, to-day, nothing is further from the truth is shown in a detailed study [1] of their mortality-rates, made by Dr. LENNOX, a former medical missionary, and now instructor in neuropathology in the Harvard Medical School, Boston, U.S.A. Deaths from violence, he deduces, have been only slightly more frequent among missionaries than among persons of the same adult ages in 1920 in America, while their relative freedom from the risks, conferred by civilisation, of the internal combustion engine gives them a decided advantage in respect of accidental death. Dr. Lennox's main data are the personnel of six American mission boards under four denominations, numbering 4263 in 1932, and a total of about 12,800 since 1812, when the first missionary representing one of these boards set sail on his quest. The average length of individual service over the whole period has been 12·5 years, about a year and a half longer at the end of the period than at the

[1] The Health and Turnover of Missionaries. By William G. Lennox, A.M., Sc.D., M.D. Published by the Advisory Committee of the Institute of Social and Religious Research and to be purchased from the Foreign Missions Conference, 419, Fourth-avenue, New York City.

beginning. The numbers analysed in 1932 represent, he reckons, roughly one-sixth of the world's Protestant Christian missionary force, so that the sample, although racially selected, is a reasonably large one. The investigation was initiated and financed by the Institute of Social and Religious Research, but in treatment of the data and in drawing conclusions he has been given a completely free hand.

Dr. Lennox finds that the death-rates among missionaries have shown a progressive decline. In the five-year period, 1825–29, out of every 1000 missionaries 35 died annually, while in 1925–29 the number was only 5. Possibly a part of this change may be due to a more favourable age and sex constitution, for the present missionary force has a preponderance of young women. In spite of this he thinks himself that the average age has more probably been increasing, and that the fall in mortality may be credited to the use of preventive measures against infectious disease, and to the more vigorous weeding out of the physically unfit. This primary selection of the physically fit, with the elimination of those with ill-health, makes it almost impossible to compare the death-rates of missionaries with those of the general population with any sense of security. Dr. Lennox makes a tentative comparison, adopting as standard the adult white population of the United States for 1920 between the ages of 25 and 74 years—doubling the numbers of those between 25 and 44 years. Judged on this basis, missionaries have a death-rate from typhoid fever nearly six times that in the United States. Deaths from small-pox numbered 0·034 per 10,000 in America and 1·08 among missionaries. On the other hand, the tuberculosis mortality of missionaries has been less than one-fourth the rate for Americans—in part, no doubt, to be accounted for by the experience that, as he puts its, "tuberculosis kills only after long warning, and the warned may have left the missionary force"; and this explanation is borne out by the fact that tuberculosis is responsible for 9·7 per cent. of all withdrawals for reasons of health. A still more serious cause of withdrawal or loss of time is, however, found in functional nervous disorders which Dr. Lennox calculates are responsible for 17·7 per cent. of "preventable health losses"—a larger item than losses from all the tropical infections combined. The most urgent problem for the future is therefore a means of determining the potentially neurasthenic, and for this end he advises that a person with both psychiatric training and a first-hand knowledge of conditions in the field should be employed to interview all candidates. Eagerness to reach the battle-front of missionary activity may in reality be a retreat from impending failure or fear of failure at home; it is desirable to ascertain whether the desire to enlist arises from the true pioneer instinct or indicates simply restlessness and discontent. A study of the "nervous wrecks" of the past should help to ascertain how far the wreckage was due to inherent unseaworthiness of the craft. Many missionaries believe they break down because of overwork. Dr. Lennox suggests that the cause may rather be underwork and over-friction—wasteful habits of thought and action. Nevertheless it must not be forgotten that selection is not being made of an athletic team; many leaders whose names will be remembered would not have passed a modern physical examination. "The person whose soul is sensitive to spiritual things has," he remarks, "oftentimes a sensitive nervous system."

One hazard of missionary life is vicarious. About three-fifths of all missionaries at the time of leaving the field are married, and in most fields the children born to them remain with their parents. Information of the risk run by the younger generation is scanty, being limited, in Dr. Lennox's report, to 3718 missionary children in Japan and China, who are compared with a control group of 2185 children of Church pastors and members, and of college graduates in America. In Japan the mortality-rate was less, while in China it was more than that found amongst the American children, the rate in China being, it seems, particularly high during the first three years of life. The diseases that Dr. Lennox finds have taken more lives of children in mission fields than in America are dysentery, diarrhœa, and small-pox in China, "malnutrition" in Japan, but considering the small numbers involved these subdivisions by age and cause are precarious. In fact, the study as a whole is open to the criticism that the size of population concerned and the number of deaths involved in particular cases are not clearly indicated. Dr. Lennox himself thinks that when intelligence and care are applied it is possible for children of missionaries working in Japan to be reared without undue loss. About Africa and other fields he is not so sure.

MEDICAL BIBLIOGRAPHY

As a supplement to the last *Bulletin* of the Institute of the History of Medicine, associated with the Johns Hopkins University, there has appeared a volume that will be useful to all working in the field of medical history. This consists of a list, made as far complete as possible, of texts illustrating the history of medicine; it should prove of real assistance to the researcher in finding his way through masses of medical literature, as well as to librarians in building up collections of the medical and biological classics. Dr. Fielding H. Garrison, than whom no wiser bibliophile could be found, is responsible for the "check-list"—that being the useful term employed. The work, as originally compiled by him, was published in the Index Catalogue of the Surgeon-General's Library in 1912, while the revision and expansion in the Johns Hopkins *Bulletin* have been made possible through the courtesy of Prof. Sigerist.

ROYAL SOCIETY OF MEDICINE.—Mr. Norman Gamble presented to this society £1000 to form a fund to provide a prize of £50 every fourth year for the best original work carried out in the four preceding years in otology. An award will be made in October, 1934, and grants will also be made from the fund in aid of research work in otology. Applications should be sent to the secretary of the society, 1, Wimpole-street, London, W.1, not later than Sept. 30th.

ANNOTATIONS

THE VITAL STATISTICS OF 1932

CLOSE study of the figures in two reports recently issued [1] does not show anything exceptional about the year 1932. It is true that both in England and Scotland the birth-rate was the lowest on record (15·3 per 1000 in England and Wales, 18·6 per 1000 in Scotland), but the fall in the birth-rate has been too continuous to excite surprise. The death-rate at 12·0 per 1000 for England and Wales and 13·5 per 1000 for Scotland differs but little from the average of the past ten years. As regards infant mortality England and Wales has a substantial advantage over Scotland, the rates in 1932 being 65 and 86 per 1000 live births. This difference is discussed in some detail in the Scottish report by Dr. P. L. McKinlay, superintendent of statistics, who finds the greatest relative excess under the heading of infectious diseases, particularly scarlet fever and diphtheria, while other prominent causes of excess are congenital debility and tuberculosis. On the other hand, diarrhœa and enteritis, syphilis and infantile convulsions are appreciably less in Scotland than in England. Taking the figures over a wider period of time, it is found that in the decennium 1911–20 infant mortality in Scotland was, in fact, 5 per cent. below the death-rate in England and Wales, whereas in 1921–30 it was as much as 22 per cent. above. The rates in both countries have improved, but the rate of improvement has been considerably greater in England and Wales. The present rate in Scotland is more akin to that recorded for the northern counties of England. In spite of the industrial depression, tuberculosis in 1932 again furnished a new low record with death-rates of 837 per million in England and Wales and 840 in Scotland. The standardised death-rate from cancer showed a small rise for males in England and Wales but a fall for females which has been slight but continuous since 1928, when the rate was 1000 per million compared with the 965 registered in 1932. In Scotland malignant disease accounted for 11 per cent. of the total deaths registered. The death-rate from cerebro-spinal fever, though showing a decline from the level of 1931, continues to be abnormally high. Both in 1931 and 1932 slightly over 2000 cases were notified in England and Wales compared with an annual average of roughly 450 cases in 1922–30. A point of interest in the English statistics is an increase in the death-rate from pernicious anæmia. The deaths attributed to this cause showed an appreciable fall in 1928, following the introduction of treatment with liver extract, but have since shown a slow rise, and in 1932 were not far below their old level.

In England and Wales with annually nearly half a million deaths and over half a million births to be analysed, the Registrar-General now follows the procedure of first issuing the mass of data, in total and with numerous and important subclassifications, and follows this later with his detailed comments upon the statistics. In Scotland it is possible to combine both the material and the interpretation in the one report. In the present review Dr. McKinlay pays special attention to the death-rate from exophthalmic goitre (the registered mortality from which has increased during the last 20 years in England and Wales, Scotland, and America), to infantile mortality in the last two decades, to the effect of changes in the age-distribution of population on the rates of mortality, and to the trend of mortality at different periods of life during the last 70 years. Under the last heading he lays stress upon the interesting fact that pre-school children, whom the public health services have least directly touched, have shown an improvement in mortality that has been continuous and extensive—in fact more extensive than at any other age, except the group 5–10 years. At the present day the mortality of the pre-school child is only approximately one-quarter of its level 70 years ago.

[1] Registrar-General's Statistical Review of England and Wales for the Year 1932. Tables. Part I., Medical. H.M. Stat. Office. 6s. The Seventy-eighth Annual Report of the Registrar-General for Scotland. 1932. H.M. Stat. Office. 3s. 6d.

QUALIFICATION FOR PSYCHIATRY

SOME months ago Dr. F. M. R. Walshe contributed to *Archives of Neurology and Psychiatry* an incisive article on the training of the neurologist. A similar paper on the training of the psychiatrist has now appeared in the same journal (November, 1933), and its author is Prof. Adolf Meyer, the most authoritative voice that could speak on the subject. The views he expresses rest on an unequalled experience in teaching psychiatry, and their wisdom is opportunely welcome at a time when there is much special pleading. For him psychiatry defines its domain as the study and treatment of all abnormal conditions in which are involved man's behaviour and mentation. This is the only tenable view; it disposes of the attempts to discriminate between psychotherapist, psychiatrist, and research worker, and it brings together all the varieties of mental disorder, whether transient or lasting, "psychotic" or "neurotic," mild or severe. The training of the psychiatrist must therefore be wide, and Meyer would have it begin early in undergraduate education and continue, after graduation, in a teaching centre where the whole range, including research and treatment, is available. Until recently it has been customary for those in England who wished to obtain a thorough training to go to Dr. Meyer's clinic or some other famous centre abroad, but happily this is no longer so necessary. Undergraduate training in psychobiology and psychiatry here is certainly not what he would advocate, but the English method of clinical teaching keeps the student in touch with "the living person," and there is an insistence on the broad medical training of the future specialist which is wholly in accord with his view. Post-graduate training, as for the Diploma in Psychological Medicine, ensures a sufficient knowledge among the general run of psychiatrists; for those who are to lead as teachers and research workers, or who desire a more complete preparation for their specialty, a period of two years in a university clinic may be regarded as essential. At present there is one such centre in London and one in Edinburgh. The problem of attracting to these centres able and balanced persons is difficult in the United States as it is here; Meyer remarks how unsuitable for the practice of psychiatry is the person who has to be stirred by the extraordinary or by his own discomforts and preoccupations. The question of careers is pertinent in this connexion; Meyer hopes that the rewards of the psychiatrist will come to depend less on earnings from patients, and that the financial support of psychiatry and its contributory sciences will be regarded as a task of advancing culture even if the benefit to the individual sufferer may suffer. He discusses also the vexed question of psycho-analytic training. Where an aspirant has been analysed

because of his own maladjustment or where his interest has been aroused by the lure of the revelations, there is reason to suspect his fitness. On the more general issue Meyer's attitude is one that gives to psycho-analytic training as wide a scope as it can reasonably claim; it is to be an incident in the broader training of the psychiatrist, limited to physicians of especial talent, common sense, and critical ability, after they have been inured to the most rigidly disciplined psychiatry and psychobiology. The career question has been raised lately in England, and the claims of psycho-analysis urged with assurance rather than persuasiveness, but never by anyone who has had a broad adequate training in psychiatry. At a time when psychiatry may be said to be coming into its own in England, however slowly, especial importance attaches to Dr. Meyer's views on these points and on the necessity for a properly coördinated training in neurology and internal medicine, as well as for common sense and a systematic observation and understanding of normal human behaviour on the part of the psychiatrist, who must by active participation in treatment and research learn to understand not only the methods but also the value and limitations of these.

ROUX AND CALMETTE

Paris Médical for Dec. 23rd, 1933, is a special number in honour of Émile Roux and Albert Calmette. In it are reproduced verbatim such of their works as seemed to Dr. C. Dopter the most significant for the history of medicine. There are three articles by each of the savants. The first is the contribution to the study of diphtheria made by Roux and Yersin to the *Annales* of the Pasteur Institute in 1888; it was this work on diphtheria toxin on which Emil v. Behring based his successful attempt to produce a protective serum. The second contains Roux's address on serum treatment in diphtheria to the International Congress of Hygiene at Budapest in 1894, and his considered conclusions on prophylaxis which, now nearly 40 years later, are by no means out of date. The third is a study of tetanus contributed to the *Annales* by Roux and Vaillard in 1893. Calmette's work is epitomised in his contribution of 1894 to the *Annales* on snake venom, the first communication on preventive vaccination by means of B C G, made by himself, Guérin, Weill-Hallé, and others, to the Academy of Medicine in 1924, and the classical account of the tuberculosis dispensary at Lille which he gave at the London Tuberculosis Congress of July, 1901. The issue contains a remarkable series of portraits; that of Roux, by the caricaturist Bils, is quite admirable, and a group of Calmette surrounded by his collaborators, taken in 1906 at the Pasteur Institute in Lille, has more than historic interest.

MINERVA

THE thirty-first edition of this Year Book of the Learned World is before us.[1] The thirtieth edition, as was noted when we reviewed it just three years ago,[2] had reached the limit of size. Like the mammoth its bulk hindered its circulation. There were three volumes containing 4345 pages and needing 8½ in. of bookshelf space. The editors, Dr. Gerhard Lüdtke and Dr. Friedrich Richter, cast around for some means of making the work more portable but not less useful. They arrived at the rather surprising decision to segregate from the alphabetical sequence all the teaching institutions in order to make of them a small handy volume which could be kept up to date and published annually, leaving behind all such things as research institutes, observatories, libraries, archives, museums, commissions, and learned societies about which information does not tend so rapidly to get out of date. These might perhaps be called the quietist and propagandist sections of the learned world, and it is the quietist section in two volumes which has now appeared. The smaller propagandist section is announced for early publication. In his preface, dated Jan. 21st, 1933, Dr. Lüdtke expresses the hope that the new arrangement will find acceptance in the scientific world, and that the work in this form will again help to throw intellectual bridges between land and land.

[1] Minerva. Jahrbuch der Gelehrten Welt. 31st edition. Berlin and Leipzig: Walter de Gruyter and Co. 1933. Part 1, Vol. I. Pp. 1163. RM.32. Vol. II. Pp. 1408. RM.36. Part 2 to be issued shortly.

[2] THE LANCET, 1930, ii., 1407.

DEATH FOLLOWING BLOOD TRANSFUSION

UNDER the heading of "néphropathies graves post-transfusionelles" A. Liège and A. Herr[1] report two cases in which unsuitable blood was used for transfusion. Both patients were children; one was transfused for anæmia due to intractable epistaxis and the other for grave sepsis following otitis media. In each case the transfusion was followed by shock, jaundice, and anuria; one child died 37 days after the transfusion, by which time diuresis had been re-established, and the other within 24 hours of it. Both belonged to Group O (IV) and the donors were supposedly of the same group; but in each case subsequent investigation showed that the donors were actually of Group B (III). Although Liège and Herr attribute the deaths to "néphropathie" arising from the transfusion they offer no conclusive evidence in favour of this view. Microscopical illustrations of the kidney in the first case show that at the time of the transfusion the patient was suffering from chronic interstitial nephritis, to which no doubt the epistaxis was attributable. In the second case the tubules were filled with hæmoglobin, but there was no other sign of renal damage; the patient was suffering from meningitis, from which death was in any case inevitable, and no reason is given for supposing that the renal lesion caused it. It is well known that an incompatible transfusion may prove almost immediately fatal, but these records show the necessity for careful scrutiny in all cases where death is attributed to renal damage rather than to the introduction of incompatible blood.

The fact that donors belonging to a transfusion service and supposedly of Group O should have proved to be of Group B deserves close attention. Liège and Herr point out that one of them had given his blood many times previously without evil result, and they regard this as proof that his group had suffered change. The weight of evidence is strongly against the possibility of such a change; but it is recognised, on the other hand, that the titre both of iso-agglutinogens and agglutinins may vary. As a rule the agglutinogens of the red cells alone are observed in determining the group, and it is quite likely that in these two cases the agglutinogen B, previously present in such low titre as to escape observation in ordinary testing, had assumed a higher value. The group of no individual can be regarded as established beyond the possibility of doubt unless both agglutinogens and agglutinins have been observed not only by agglutination but also by absorption. To do this with all donors is simply not practicable; hence it is never safe to trust to grouping tests alone in the selection of donors. In all cases recourse should be

[1] Ann. de Méd., 1933, xxxiv., 399.

had to "matching"—indeed, of the two procedures, this is the more important. Yet even with the employment of universal donors and preliminary matching dangerous reactions and even deaths have been reported. In these cases it has been plausibly suggested that the evil results were due to the high titre of the donor's agglutinins. Usually the recipient's plasma dilutes these to such an extent that they are negligible, but if the titre either of the donor's agglutinins or of the recipient's agglutinogens is unusually high this may not happen. Cross-matching will reveal the possibility of this danger, but not the certainty of its presence.

As a general rule it may be taken that a donor of the same group as the recipient is safe, but grouping without matching should never be relied upon. In any case it should not be forgotten that the selection of donors demands the utmost care and considerable experience, and should never be lightly or hurriedly undertaken. Even when all possible precautions in the selection of the donor have been observed it is well to perform the "biological test"—that is, to introduce 5 c.cm. of the selected blood and then wait five minutes and watch the effect on the patient.

THE RITUAL OF THE WET SHEET

IN an address published in *Folk Lore* last June,[1] Miss M. E. Durham argued that many of the devices adopted by primitive man to prevent his dead from returning as ghosts were really safeguards against infection. Purification rites performed by the relatives included bathing in sea-water, or remaining in seclusion for a time, while sometimes the body was ferried across a river to burial. But these and similar measures were often distorted until they became pointless, and such a decline is illustrated in the story of the carbolised sheet, as learnedly told by Dr. John Ritchie[2] of Dumfries. The custom is passing, but it is still not uncommon to see a sheet soaked in antiseptic hanging outside the door of the room in which a patient with an infectious disease is being nursed—the theory being that the scarlatinal streptococcus and his colleagues turn pale at the odour of carbolic, and rather than cross the threshold prefer to remain prisoners in the sick-room. Savage races, it seems, share this belief that infection can be checked by physical barriers, and they block their village paths with thorn twigs to keep out the devil of disease. There is some sense, indeed, in this, for if thorns cannot keep out spirits they may well deter a carrier of infection. Dr. Ritchie reminds us that during the Plague of 1603 when a Londoner died in a country town no one could be found to bury him, and "every one," as Thomas Dekker noted, "with bag and baggage marcht home, barricadoing their dores and windowes with firbushes, ferne and bundles of straw to keepe out the pestilence at the staves end." These precautions at least prevented the plague-stricken passers-by from breathing infection into their neighbours' faces "in spite," as Pepys tells us they were ready to do in his day. The carbolised sheet of modern times is by no means so effective an obstruction, but as a matter of fact it originally had another and more satisfactory function. In early times cold water was used to cool the air of the sick-room, both by the methodists at the beginning of the Christian era, and by physicians of the Arabian school who, believing that hot dry air was a cause of disease, hung the walls of the room with wet sheets and spread cooling herbs and flowers on the floor. Later, in the time of the Black Death, it was still held that hot dry air must be cooled and moistened, and attempts were made to purify it by adding vinegar to the water in which the wall sheets were soaked. Thenceforward the belief that air could be disinfected continued to gain ground, and many substances have been credited with power to neutralise the miasma emanating from the patient. The contagion of typhus was said to be destroyed by the fumes of nitrous acid, and the same result was expected from chloride of lime spread upon the floor—a sad decline, surely, from the herbs and flowers of less civilised times. Even to-day the air of the sick-room is often sprayed with disinfectants, and no doubt they cool it as pleasantly as the wet sheet of the past. But the sheet itself, robbed of its original function, has migrated outside the door, and become a symbol to warn away the healthy; just as (Dr. Ritchie tells us) a "quhyt claith" was once hung upon the doors of Scottish houses to warn neighbours of the pestilence. The change of situation provides a good example of the degeneracy of sound practice into more or less useless ritual.

[1] See THE LANCET, 1933, ii., 570.
[2] Caledonian Med. Jour., 1933, xv., 155.

EXCRETION OF HORMONES IN MIGRAINE

FROM being classed as a vaguely elegant affliction and left at that, migraine has during the last 20 years become the subject of laborious research. It has been studied in relation to epilepsy, cerebral vascular lesions, paroxysmal tachycardia, endocrine disturbance, the vegetative nervous system, and allergy; the sella turcica has been accused of causing its headaches by compressing the pituitary during periods of physiological enlargement; abdominal migraine has been recognised, psychic equivalents have been conceded, and the pressure of the cerebro-spinal fluid has been measured during attacks, with contradictory results. Recent work by Riley, Brickner, and Kurzrok[1] indicates a relationship between migrainous attacks and the abnormal secretion of prolan in the urine. Whereas theelin (the œstrus-producing hormone, also known as œstrin, folliculin, or progynon) is normally found in the urine throughout the menstrual life of women, prolan (an anterior pituitary gonadotropic hormone or something akin to it) is normally absent except in pregnancy and after the menopause. Riley and his colleagues found that in the urine of migrainous women theelin was usually absent or reduced in quantity, while the attacks of migraine were nearly always preceded by the appearance of prolan in the urine. Results pointing in the same direction have now been obtained by three French observers, P.-L. Drouet, L. Mathieu, and L. Collesson,[2] who have examined pituitary function in migraine by injecting frogs with samples of urine from migrainous patients and observing changes in pigmentation. Drouet, working with Prof. R. Collin, had previously used this method of estimating pituitary function in Graves's disease and cases of pituitary tumour; the test depends on the presence of a melanophore-dilator in the secretion of the posterior and perhaps the other lobes. The same substance causes dilatation of the erythrophores of a minnow, *Phoxinus lævis*, and Drouet and his co-workers have used this action to confirm their results in some cases. Altogether, they injected 624 frogs with 312 samples of urine, and 39 minnows with 9 samples of urine which had previously given a positive melanophore reaction in frogs. They found that the pituitary hormone causing these

[1] Bull. Neurol. Inst. New York, 1933, iii., 53; see THE LANCET, 1933, i., 1141.
[2] Bull. et mém. Soc. méd. hôp. de Paris, Dec. 18th, 1933, p. 1485.

pigment changes appeared in the urine of 12 out of 14 migrainous patients at the times of the attacks. The hormone might be present for a period lasting from one to ten days; its appearance in the urine was not always rigidly synchronous with the attack, but sometimes preceded or followed the onset of headache; in some cases, again, the hormone disappeared at the crisis of the attack and reappeared for a time as it subsided. Between the attacks the urine of these patients gave negative melanophore reactions. In 2 cases out of the 14 no positive reaction was ever obtained, though clinically these resembled the others. The observers conclude that in 12 cases of their series there was hypersecretion of a hormone believed to be derived from the posterior lobe of the pituitary, and that this was probably accompanied by overactivity of the whole gland. They regard their findings as evidence, at all events, of a physiological disturbance of the pituitary during attacks of migraine. Unfortunately they give no details of their technique, and the reader is left wondering what substances other than pituitary hormone will cause a frog to change colour or bring a blush to the skin of *Phoxinus lævis*.

THE TREATMENT OF SUBACUTE COMBINED DEGENERATION

THE discussion on the treatment of subacute combined degeneration of the spinal cord, at a joint meeting of the sections of neurology and of therapeutics and pharmacology at the Royal Society of Medicine on Dec. 21st, revealed general agreement on the value of adequate treatment, but much difference of opinion as to what form treatment should take. Even more divergent were the views expressed on the criteria necessary for diagnosis and the nature of the lesions. Dr. E. A. Carmichael and Dr. C. C. Ungley maintained that the signs must be both bilateral and objective. The blood picture must be of the pernicious type, and a typical reticulocyte response to liver therapy must occur, and there must be complete achlorhydria to histamine stimulation. In Dr. Carmichael's experience subacute combined degeneration in patients under 40 was rare; Dr. Ungley had met with typical cases at an earlier age. Others taking part in the discussion were prepared to accept far less stringent criteria of diagnosis. Prof. F. Langmead and Dr. Wilfred Harris suggested that too much emphasis may have been laid in the past upon the exact character of the anæmia, holding that in general nervous symptoms associated with anæmia respond dramatically to large doses of iron alone. Neither of the speakers adopting the more rigid criteria of diagnosis had failed to find any response to massive iron therapy, but they agreed that the response to liver, especially in the form of intramuscular extracts, was extremely satisfactory; Dr. Ungley thought that possibly extracts prepared by pressure were more satisfactory than those extracted by Colin's process. Dr. L. J. Witts pointed out that equally satisfactory results had been obtained with stomach preparations; he quoted J. F. Wilkinson's large series of patients with pernicious anæmia, none of whom had developed cord symptoms, though they had received stomach extract only.

E. Meulengracht [1] has recently reported that in his hands stomach extracts are at least as effective as liver in the treatment of cord lesions. It seems probable that as long as the red cell count is maintained above 5,000,000 per c.mm. cord lesions are not likely to develop, and that treatment that will raise the blood count to this level will improve the nervous symptoms. There is as yet no convincing clinical, as opposed to experimental, evidence that cord lesions can be relieved independently of the blood picture. Prof. E. Mellanby described at the discussion an interesting group of animal experiments in which he had been able to produce lesions in the cord not unlike those of subacute combined degeneration by feeding a diet poor in vitamin A; the addition of vitamin A to the diet prevents the appearance of the lesions, also whole liver and its fat-soluble content, but not the ordinary liver extracts effective in pernicious anæmia. Though making no claim to have produced experimentally spinal cord degeneration exactly similar to subacute combined degeneration in man, Prof. Mellanby suggested that its study might throw light on the ætiology of this lesion, which may be related to, but in some essential ways different from, that of pernicious anæmia. The blood changes induced in the animals are relieved by a water-soluble factor present in whole liver, the experimental lesions only by a fat-soluble factor. In view of these observations it is disappointing that both Carmichael and Ungley have found vitamin A useless in the treatment of subacute combined degeneration in man.

In the course of the discussion Dr. Carmichael brought forward interesting observations on the changes in sensory nerves. He was able to demonstrate that great loss of myelin in sensory nerves is a striking feature, a fact which has been known for some time, but has hardly received the attention it deserves. In his view the recovery that occurs after adequate treatment is largely due to recovery of sensory nerves and not of cord lesions.

[1] Klin. Woch., 1933, xii., 1163; Ugeskrift for Laeger, 1933, xcv., 819.

THE NATURE OF FILTRABLE VIRUSES

THE claim to have demonstrated that a filtrable virus is inanimate is not a novel one, and in their observations on tobacco mosaic disease E. Barton-Wright and A. M. McBain [1] are dealing with a virus whose animate nature has already been called in question by the work of Vinson and Petre in America. It may be that (as they believe) this virus is an unorganised thing; on this it is well to keep an open mind. But there are two points, germane to the controversy over the nature of viruses, which are sometimes overlooked. The first concerns the inadvisability of generalising from observations made on one virus only. Barton-Wright and McBain make no such generalisation, but others may be tempted to do so for them. There is no good reason for supposing that all filtrable viruses are of the same nature; in fact, in the case of the animal viruses we have evidence that this is not so; the viruses of bovine pleuro-pneumonia and agalectia differ obviously from the rest. The second point concerns the difficulty of proving that a virus is inanimate. Leaving aside the filtrable viruses it is generally agreed that the causal agents of infective processes are living organised things. In the absence of proof to the contrary it is reasonable, therefore, to assume that all infective processes are caused by living agents, and those investigators who wish to prove this untrue will have to advance very solid proof if they are to convince. The short note published by Barton-Wright and McBain contains little detail, but put briefly their claim rests on two observations. From a purified (phosphate eluate) virus suspension they have obtained two fractions, one a protein and the other a white crystalline solid. Both were virulent, and the crystalline material, when purified by repeated

[1] Nature, Dec. 30th, 1933, p. 1003.

precipitation, remained virulent but contained no detectable nitrogen. Further precipitation of the phosphate eluate by means of 1 per cent. safranin, resuspension of the precipitate in water, and removal of the safranin with amyl alcohol gave them an aqueous solution which, though infective, contained neither protein, nitrogen, nor phosphate. Might it not be, however, that the test for nitrogen and protein were not as delicate as the test for virus?

ALFRED HESS

Dr. A. F. Hess died in New York on Dec. 6th. He was of the rare company of those who weld scientific research and clinical observation into a practical instrument for the betterment of mankind. If people can be divided into those who want things better and those who do not care, Hess, by his work on child nutrition, emphatically placed himself in the first category. To nutritionists his outstanding observations were those he made on scurvy in the second decade of this century; he was the first to formulate the concept of "latent" scurvy, a condition in which the infant fails to grow and thrive through lack of vitamin C, but does not have any of the classical symptoms. A bold but thoroughly justified experiment, in which fresh fruit juice was withdrawn from the dietary of institutional babies receiving pasteurised milk, served as an admirable demonstration of his concept. Subsequently, in the complicated story of ultra-violet light, vitamin D, and rickets, Hess's name occurs ever again, though with so many in the same field one cannot fairly ascribe to a sole worker responsibility for any single discovery of major importance. Hess's part in the united progress of knowledge was certainly no small one, and he shares with H. Steenbock the priority in announcing the production of vitamin D in inactive foodstuffs by their exposure to ultra-violet light. His most recent work, noticed lately in our columns, and recounted by him in the Ingleby lectures given in Birmingham last year, was a large observation on institutional babies intensively treated with vitamin A. He concluded that this vitamin is not a protective agent against ordinary respiratory infections.

WORLD REQUIREMENT OF NARCOTICS

THE new supervisory body, appointed by the League of Nations under the 1931 convention on the limitation of manufacture of dangerous drugs, has issued an elaborate statement on the estimates for 1934 of the world requirements of such drugs. Forty-five countries furnished the requisite estimates, and in the case of 23 countries which did not submit estimates the supervisory body framed estimates for them. The total figures for the five chief drugs for 1934 are: morphine, 40 tons; heroin, 1½ tons; codeine, 26 tons; dionin, 2½ tons; and cocaine, 5½ tons. It must, however, be borne in mind that heroin, codeine, and dionin are derivatives of morphine, and that of the 40 tons estimate for the latter, 29½ tons are to be used for conversion into these derivatives, leaving some 10 tons of morphine to be utilised as such. These figures then approximate to the standards set by the League of Nations for the annual world requirements for medical and scientific purposes—viz., morphine, 9½ tons; heroin, 2 tons; and cocaine, 5½ tons.

The last report of the advisory committee on traffic in opium and other dangerous drugs has called attention to illicit traffic by private aeroplanes and also by international sleeping-car services. The situation in Manchukuo is highly unsatisfactory. It is known that a profitable trade in narcotics is there carried on, and that the government of that new territory is assuming a monopoly of such traffic. No reports are, however, furnished to the League of Nations, and the menace to other countries from illicit traffic is regarded as grave. It is satisfactory to learn that Portugal has ratified the Bangkok agreement by which it is hoped to regularise and reduce the trade in prepared opium (for smoking) in the Far East, and the Portuguese colony of Macao is accordingly providing for an opium revenue replacement fund.

The term of office of membership of the advisory committee—viz., seven years—is about to expire, and it is proposed to increase its membership from 21 to 25 by the addition of representatives from Turkey, Persia, Canada, and one from the four Scandinavian countries. Regret is expressed at the withdrawal of the German representative in accord with the Hitler policy towards the League of Nations.

GROWTH AND DEVELOPMENT

MOST large-scale studies of growth have been based upon measurement of a cross-section of the population, the trend of growth shown being by comparison of groups of children at different ages. Miss R. M. Fleming, in a report issued by the Medical Research Council,[1] has followed a more ambitious programme, her aim being to take successive annual observations on the same children and thus observe the actual development of individuals. In this she has achieved a considerable measure of success, although practical difficulties intervened and about a third of the children were in fact measured only once. The measurements were made by her at annual visits to schools in England and Wales, over 4000 children coming under observation and over 12,000 observations being made of stature, head measurements, eye and hair colour. Nearly two-thirds of these children were of Welsh ancestry on both sides, one-fifth of English stock, and the remainder of mixed ancestry. The mass of data obtained has been submitted to statistical analysis by Mr. W. J. Martin of the Council's statistical staff, and forms a valuable addition to the literature of the average course of growth, including the tabulation of measurements of many characters not previously published for a population of this type. The individual records Miss Fleming has endeavoured to classify into broad categories of growth rhythm and physical type, and she has tried to relate to the latter the occupational preferences and abilities which each child revealed, thus seeking, as the preface to the report puts it, "to do more accurately what the ancient physicians sought to do." For instance, the group comprising dark-pigmented and long-headed individuals (a large element in the Welsh population) showed a high proportion with æsthetic interests and abilities; they were good at languages and literary subjects, were musical, and had little taste for games and physical exercise. The fair-pigmented children (characterised also by other physical differences) showed, on the other hand, a decided preference for athletics and outdoor sports, were more ambitious, and less interested in æsthetics. Another difference in preferences brought out by Miss Fleming is the much wider range of hobbies reported by boys as compared with girls, and she suggests that this aspect of girls' education has been given too little thought. She supplies some striking illustrations of the

[1] A Study of Growth and Development. Observations in successive years on the same children. By R. M. Fleming, with a statistical analysis by W. J. Martin. Med. Res. Council, Spec. Rep. Ser. No. 190. London: H.M. Stat. Office, 1933, pp. 85, 1s. 6d.

apparent effects of nutritional and morbid disturbances upon the rhythm of growth. For example, a group of 40 stature graphs from a small rural school in Cardiganshire showed a curious broken line indicating first normal growth, then a check, and later a steady and continuous resumption. Inquiry suggested the explanation that a number of children came to school from such long distances that they could not go home for dinner, and that the adverse effect of the lack of a proper midday meal was not immediately apparent but was later reflected in stunted growth. In the interim a scheme was started for providing such children with a hot midday meal; the stunting was checked and normal growth ensued.

TREATMENT OF NÆVI

ALMOST all dermatologists would agree with E. H. Molesworth [1] that vascular nævi should be dealt with at the earliest possible moment. It is true that spontaneous involution sometimes takes place, but this does not happen often enough to justify a policy of laissez-faire. The question remains, however, What should be done to them? In this country the carbon dioxide pencil is the favourite weapon, and after a little experience such treatment can be safely employed for nævi of all but the largest and most deeply situated cavernous types. It is therefore somewhat disturbing to find Molesworth advocating radiotherapy as preferable to freezing for all radiosensitive tumours; that is to say, presumably, for all those that are still growing—a point which may be hard to decide. He himself prefers X rays to radium, but apart from other considerations this has the objection that the infants may be thoroughly frightened and struggle. In early cases, he says, the dose required is never more than a normal tolerated skin dose, but he does not explain what happens if this proves insufficient. Does he repeat it, or does he resort to other methods which may include CO_2 or diathermy? Those who have seen some of the late results of radium treatment applied for relatively trivial conditions in the early days of its discovery will be inclined perhaps to deprecate the views set out in this paper.

For the cavernous nævus, G. B. Dowling's method (recalled by Mr. A. P. Bertwistle on p. 22 of our present issue) deserves extended trial. He injects the ordinary quinine urethane solution in common use for varicose veins in a dose of 4–5 minims at each session. "The needle is passed in near the base of the nævus and about a minim is injected in three or four places. . . the immediate effect is an apparent solidifying of the whole nævus. In a fortnight the lesion flattens down somewhat. . . . It is then treated in the same way again, selecting parts which appear to have been unaffected by the first treatment." Three or four such applications may be required, but when he described the method in our columns in 1929 Dowling cited five cases in which he was satisfied with the results, and the only complication reported was a little sloughing. A week later Mr. Eric Lloyd wrote urging the surgical excision of cavernous nævi at the earliest possible moment; but not everyone will agree with his statement that the removal of a nævus is "one of the most satisfactory little operations in the surgery of childhood." Any loss of blood, such as is inseparable from an open operation involving the removal of a vascular tumour—not to mention the dangers of anæsthesia—ought to be avoided at these very early ages if other and harmless methods of treatment are available.

The suggestion (by no means original) put forward by J. K. Friedjung [2] to vaccinate with calf lymph at the margins of the growing nævus need not be seriously considered in these days of surgical asepsis. It is a procedure which courts infection as a method of cure and cannot be recommended in any circumstances.

[1] Med. Jour. Australia, 1933, ii., 217.

PROFESSOR COSSAR EWART

James Cossar Ewart, whose death is announced, was an authority on many branches of zoology, and an important experimenter in animal breeding. Originally educated with the intention of entering the profession of medicine, he graduated as M.D. in the University of Edinburgh, and for a period held the position of demonstrator of anatomy in the medical school. A series of studies at diverse universities, English, Scotch and Continental, was followed by his appointment to the chair of natural history in Aberdeen, and later, about 50 years ago, to the position of Regius professor of natural history in the University of Edinburgh. This chair he held for 45 years. His researches in ichthyology gained him his first wide recognition, and having started a small marine station near Aberdeen, he became a member of the Fishery Board for Scotland, and organised and carried on scientific work in this connexion for ten years. Later he carried on investigations into various fishery questions in the United States, Canada, and Scandinavia. To medical men, Cossar Ewart's work on breeding and in-breeding were of closer interest than his studies of fisheries, and on hybridity and the phenomena of telegony he wrote in 1889 an informing book, entitled the Penicuick Experiments; Penicuick being the property attached to his residence in Midlothian. For Prof. Ewart there was no such thing as telegony, the phenomena which appear to be of that nature he explained as being really due to ancestral traits arising in the offspring. But in writing on the subject, he gave fair play to both sides, even while alluding to the "damnable iteration" of Lord Morton's experiment with the Arabian mare and the quagga. Prof. Cossar Ewart was prominent also in the field of geology, and indeed was in the great Scottish tradition of the general man of science.

The death is announced of Prof. Swale Vincent, which occurred on Sunday, Dec. 31st, at his home in St. Albans, in his sixty-sixth year. He was professor of physiology in the University of London for ten years, 1920–30, and had made original studies of the processes of secretion.

[2] Wien. klin. Woch., Dec. 15th, 1933, p. 1520.

PREVENTIVE ASPECTS OF MEDICINE.—This series will be resumed at King's College Hospital on Jan. 11th at 4 P.M., when Prof. R. Tanner Hewlett will speak on the prevention of diseases conveyed by food. Subsequent lectures will be as follows: Jan. 18th, Prof. Major Greenwood on epidemiology and its lessons; Jan. 25th, Dr. R. A. O'Brien on the control and prevention of infectious diseases; Feb. 1st Dr. F. J. Poynton on the prevention of rheumatism; Feb. 8th, Dr. A. S. MacNalty on the prevention of tuberculosis; Feb. 15th, Sir Charlton Briscoe on the prevention of respiratory infections; Feb. 22nd, Dr. J. C. Bridge on the prevention of occupational disease; March 1st, Dr. S. A. Kinnier Wilson on how to live the life of modern times; March 8th, Dr. A. Douglas Cowburn on preventive medicine and the law. Dr. C. B. Heald's lecture on the value of sport and exercise in the prevention of disease has been provisionally postponed until March.

SPECIAL ARTICLES

INSULATION AGAINST HEAT AND COLD FOR HUMAN COMFORT*

THE USES OF BRIGHT METALLIC SURFACES

By G. P. Crowden, M.Sc. Lond., M.R.C.S. Eng.

LECTURER IN INDUSTRIAL PHYSIOLOGY AT THE LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE; MAJOR, R.A.M.C. (T.A.)

Bright metallic surfaces radiate very little heat compared with black matt surfaces at the same temperature. They also reflect much of the heat they receive. The method of insulation here described depends for its efficiency on these two facts. It also takes into consideration the low heat-conducting properties of air and the fact that an air-proof material hinders the passage of heat by convection currents. Briefly, the insulator is a sheet of reinforced aluminium foil—i.e., material covered on both sides with aluminium foil—fixed so as to divide the air space across which the transference of heat is to be hindered.

A TEST IN THE LABORATORY

It has been shown that if a layer of reinforced aluminium foil is fixed so as to divide an air space of 1 inch in thickness into two layers of air of ½ inch, then the transference of heat across that space is as effectively hindered as if the space were filled with a 1-inch slab of cork. Fig. 1 illustrates one of the laboratory tests carried out in which four panels were fixed in contact with the four sides of a vessel in which water was kept continuously boiling for several hours by means of an immersed electric bulb. The framework of each panel was of the same construction—namely, two slabs of asbestos cement sheeting spaced 1 inch apart.

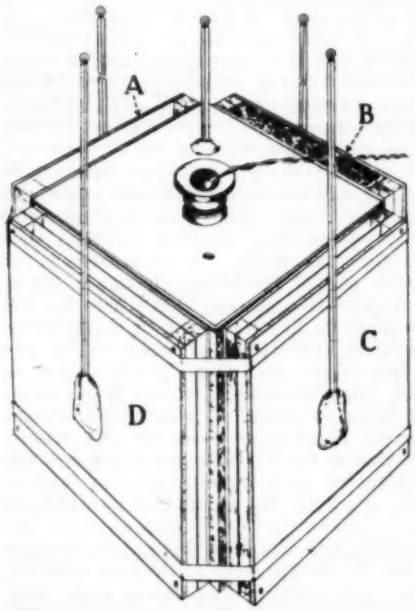

FIG. 1.—Apparatus used in testing various forms of insulation. The composition of the panels A, B, C, and D is explained in the text.

Panel A was made up of two sheets of asbestos cement only.

Panel B had the air space filled with a 1-inch slab of cork.

Panel C had the 1-inch air space divided by a layer of reinforced aluminium foil at ½ inch from either internal face.

Panel D had aluminium foil fixed on the inside surfaces of the asbestos cement sheets in addition to having the layer of reinforced aluminium foil as in Panel C.

FIG. 2.—Huts arranged for the test in the desert.

The upper and lower ends of the panels were made air-tight by surgical tape to prevent any cooling due to air circulation.

The air temperature in the laboratory was 68° F., and after keeping the water boiling for 2½ hours the temperatures of the external surfaces of the panels were as follows:—

Panel A,	122·5°—i.e., 54·5°	above air temperature in the room.
,, B,	87·0°— ,, 19·0°	
,, C,	85·0°— ,, 17·0°	
,, D,	84·0°— ,, 16·0°	

The reinforced foil was in no way damaged by this degree of heat, and remained firmly adhered to the asbestos paper which formed the reinforcing substance of the diaphragm, and to the asbestos cement sheets in Panel D. The test therefore indicates that the asbestos paper reinforced foil will stand up to extreme conditions of tropical heat.

In another test Panels A, B, and C were constructed as before, but Panel D was made up of asbestos cement sheets and a diaphragm of plain asbestos paper. The results showed that an asbestos paper diaphragm, without any aluminium foil attached, materially reduces the transmission of heat across the 1-inch air space, but the addition of aluminium foil to the asbestos paper as in Panel C effected a further reduction of 20° F. in the external surface temperature.

These tests are of significance when considering the use and efficiency of the insulation from the point of view of human comfort in hutments or buildings exposed either to the tropical sun or to extremes of cold.

HUTS IN THE DESERT

Thanks to the facilities afforded me by the Army authorities during a visit to the Canal Brigade at Moascar, Egypt, in August, 1932, I was able to obtain the hutments shown in Fig. 2. Three identical hutments were selected and placed in an exposed position on the desert, and arranged so that each was fully exposed to the direct rays from the sun. Each hut had the top closed with corrugated iron and the inside walls were lined as follows:—

Hut A was lined on the inside and roof with three-ply wood spaced at approximately 2 inches from the corrugated iron.

* Based on three memoranda submitted to the Director of Hygiene, the War Office, in April and May, 1933.

Hut B was lined with asbestos cement sheeting fixed in the same way as for Hut A.

Hut C had a lining of three-ply wood as in Hut A, but in this case reinforced aluminium foil was fixed to the ply wood by battens leaving an air space of half an inch, so that it formed a diaphragm between the ply wood and the inner side of the corrugated iron sheeting.

At 4 P.M. (summer time) on August 17th the surface temperature of internal walls on side exposed to sun were :—

Hut A (three-ply lining). 115° F., or 12·2° less than corrugated iron.

Hut B (asbestos-lined). 112·1°, or 15·1° less than corrugated iron.

Hut C (three-ply + reinforced foil). 103·8°, or 23·4° less than corrugated iron.

In other words, in Hut A the ply wood lining developed a temperature 20° F. higher than the air temperature, which was 95°, in Hut B the asbestos cement sheet was 17·1° higher, and in Hut C, with the ply wood and reinforced foil lining, the surface temperature was only 8·8° higher than the air temperature. At 5.45 P.M. on the same day, after the doors of the huts had been closed for some time, the air temperatures inside the huts were measured as follows : Hut A, 98·6° ; Hut B, 96·8° ; and Hut C, 95·0°.

These field tests had to be done rather hurriedly, but they were sufficient to indicate the value of the reinforced foil layer for increasing conditions of comfort, and moreover showed that it could be easily and quickly fixed in position. Figs. 3 and 4 show ways of applying the reinforced aluminium foil to walls and above the ceilings of buildings, and I believe that greatly increased comfort in tropical buildings, such as bungalows and temporary hutments, can be easily and economically attained by the use of this method of insulation.

TESTS ON SHIPS

While en route for Egypt on the P. and O. liner *Cathay* I was allowed to carry out insulation tests in a corridor, one wall of which, on the funnel side,

FIG. 3.—Application of reinforced foil insulation to a ceiling.

was always distinctly hot to the touch, and known to cause discomfort to passengers in the cabins opposite. With the aid of the ship's carpenter a panel was constructed comprising an outer sheet of tin and an air space of 1 inch, in the middle of which was fixed the reinforced aluminium foil. The panel was fixed to the corridor wall and a thermometer was stuck to the centre with plasticine, another thermometer being stuck on the wall of the corridor. The thermometers were observed over a period of four hours, during which the one on the corridor wall itself registered temperatures between 122–123·8° F., and that on the panel 87·8–91·7°, indicating a drop in surface temperature of over 30°. The temperature of the air circulating through the corridor at the time was 86°.

During my return passage from Port Said on the Orient liner *Orsova* I was given permission to carry out tests on insulation in the stokehold. In one of these tests the panel with reinforced foil insulation was fixed to a hot plate on one of the boilers. The temperature of the plate was 164·3° F., and after one hour the temperature of the surface of the insulating panel reached stability at 129·2°—i.e., 35·1° lower temperature. Although this test indicates a drop in surface temperature which, if it were produced over the whole surface of the boilers, would undoubtedly render conditions in the stokehold much better, there are, I think, great practical difficulties in the way of using this insulation in a coal-fired boat, because the dust would penetrate and cover the bright foil surfaces unless the casing of the boilers consisted of dust-tight insulating panels. Apart from this, however, there are many cabins and corridors on a ship where the use of reinforced aluminium foil insulation panels would undoubtedly render conditions more comfortable for passengers and crew. In hospital ships and in the sick bays of naval boats some such arrangement of the insulation should prove of particular value.

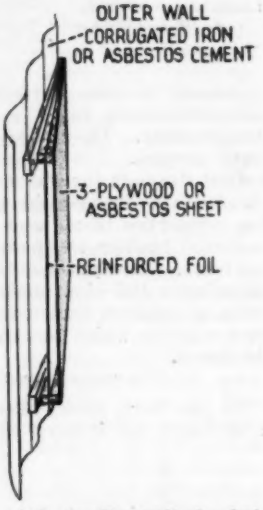

FIG. 4.—The wall of a hut, consisting of corrugated iron and three-ply wood (or asbestos) separated by reinforced foil in an air space.

TENTS, TRAINS, AND AMBULANCES

I had not enough material with me in Egypt effectively to insulate the whole of a bell-tent, but foil was attached so as to divide the air space between the inner and outer flies of one tent. The tent with the foil was materially cooler than another identical tent in which no foil was fixed. A measurement of the temperature of the surface of the inner fly at 9.20 A.M. on August 20th showed that where the foil was fixed the inner fly had warmed to a temperature of 99·8° F., as compared with 104° where no foil was between the inner and outer flies. If foil affixed to canvas proves durable enough to withstand wear and tear of folding, it should be possible to achieve greatly increased comfort in tents in the desert. It is possible that a fly composed of reinforced foil could be constructed with definite lines of folding, so that on rolling up the foil would not be damaged at the folds.

By means of the Moll radiation thermopile observations were made on the intensity of the heat reflected from the desert both looking towards and away from the sun, and it was found that there was very little difference in intensity. This is a fact of considerable importance, for the reflected heat and glare from the desert is again reflected from the ceilings and walls of hutments, houses, and railway carriages on to the occupants. At 4.30 P.M. on August 19th the intensity of the radiant heat reflected from the desert, looking away from the sun, was equivalent to the heat emitted from a black radiator having a temperature of 135° F. It appears, therefore, desirable that wherever there is a chance of reflected heat from the desert reaching the inside walls of a room, the walls and, in particular, the ceiling should be good absorbers of heat and not reflectors. I am of the opinion that railway companies would be well advised to look into the question of desert glare, and try a

dark green distemper on the inside roof of compartments instead of white, which simply reflects a great deal of the heat on to the passengers. Moreover, if the ceiling is curved, as it usually is, the unfortunate passenger is almost at the focus of a heat-reflecting surface.

I carried out a test of reinforced foil inside the hood of a touring car, but unless the foil is itself protected from desert glare it is worse than useless, for it simply reflects the heat of the desert on to the passengers, although it is true that it cuts off the heat which would be otherwise radiated on to them from the hood. In motor ambulances, I feel convinced, increased comfort would be afforded by using the reinforced foil. The ceiling of the ambulance should be dark green in colour if reflected heat from the desert is to be avoided; but if the back of the ambulance is closed this matters little.

TROPICAL HELMETS

Experiments in the department of industrial physiology at the London School of Hygiene and Tropical Medicine have shown that the non-metallic helmet linings, whether of red, green, or khaki fabric as in service topees, or made from cork or pegamoid material, radiate as much heat to the head of the wearer as if the linings were black in colour. By sticking aluminium foil to the inside of the helmets the heat radiated to the head is reduced to one-twelfth or one-tenth of what it was before. If, in addition, a second or drop lining composed of aluminium foil attached to both sides of a sheet of fabric is fitted, use is also made of the high heat-reflecting properties of the metallic surface, and, moreover, the layer of air between the drop lining and the helmet acts as a poor conductor of heat. Fig. 5 shows the arrangement of the drop lining in a service topee.

During the summer of 1932 a large number of laboratory tests were carried out which showed

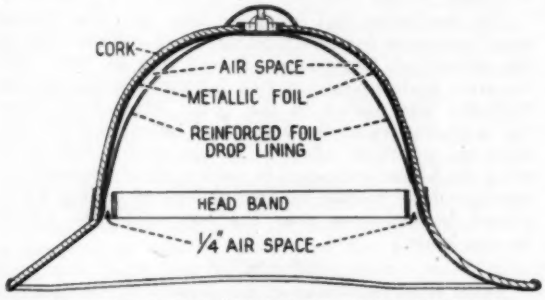

FIG. 5.—A tropical helmet fitted with reinforced foil linings.

that under identical conditions of exposure to radiant heat topees lined with bright metallic foil were much cooler to wear. They also showed that the degree of ventilation through the head-band was an important factor influencing the temperature developing inside the topee during exposure to radiant heat. Experiments with London police summer helmets, in which the ventilation is very poor, showed that a drop lining of reinforced aluminium foil lowered the temperature above the head by some 10–15° F. In an ordinary police helmet with a green pegamoid lining worn in the June sun on the roof of the School of Hygiene a temperature of 118·8° was recorded and the subject sweated profusely. Another subject wearing an identical helmet fitted with a reinforced aluminium foil lining reached a temperature of only 99·4° under precisely similar conditions of exposure to the sun.

Tests under desert conditions in Egypt were carried out with the apparatus and method already employed in the laboratory. The subjects wore topees fitted with or without the drop linings of reinforced

FIG. 6.—Testing the topees in Egyptian sunshine.

aluminium foil (Fig. 6). Thermopiles were fixed above their heads and connected to a galvanometer in the hutment, where the temperature readings were recorded. The early experiments showed that the topees varied very much in their apparent efficiency, and it was found that in some of them, owing to sweating or close fitting, the head-band had become pressed against the side of the helmet so as almost to prevent the through circulation of air. In all those which had been re-covered with lighter khaki by the tailor the loose ends of the new cover had been packed in under the top ventilator button and almost completely blocked the ventilation slots. Accordingly tests were made to determine the actual effect of through ventilation on the temperature inside topees while being worn in the sun.

A subject was selected who wore a well-fitting and almost new service topee of the Sudan type, in which the head-band was well spaced from the helmet. Through ventilation past the head-band was artificially stopped by completely covering the air spaces between the head-band and the helmet with surgical tape. The topee was worn in this condition and the temperatures above the subject's head recorded. Then the surgical tape was stripped off and the topee again worn, the subject being seated in the sun as before. Under the conditions of this test, which were mild compared with conditions in the Sudan, the temperature inside the ventilated topee reached 108·1° F. in fifteen minutes, while in the same time with ventilation stopped it rose to 117·9°—i.e., 9·8° higher.

These experiments showed that in testing the effect of the reinforced aluminium foil linings one must be sure that the advantage due to the lining is not discounted by bad ventilation of the topee. Moreover the drop linings of reinforced foil must be so fitted as not to interfere with through ventilation. When the tests on the reinforced foil linings were continued, care was taken that the top ventilator had a clear air-way, although it was impossible to alter any defects due to swollen head-bands. The subjects wore their topees with and without the reinforced foil linings, and temperatures were taken at intervals while they sat or marched under desert conditions. In the latter case at three-minute intervals they stopped at the experimental hut for a few seconds while the thermopile wires were connected to the galvanometer and the temperatures were recorded. It was found that after a quarter

of an hour's exposure to the midday sun the temperature was some 5° or 6° lower inside the topee when the lining was worn, whether the subject was marching or sitting. In these and in the other tests the men remarked on the fact that sweating on the face ceased to be noticeable when the reinforced foil drop linings were worn.

The air temperature during the experiments ranged between 97° and 100° F., and on most days

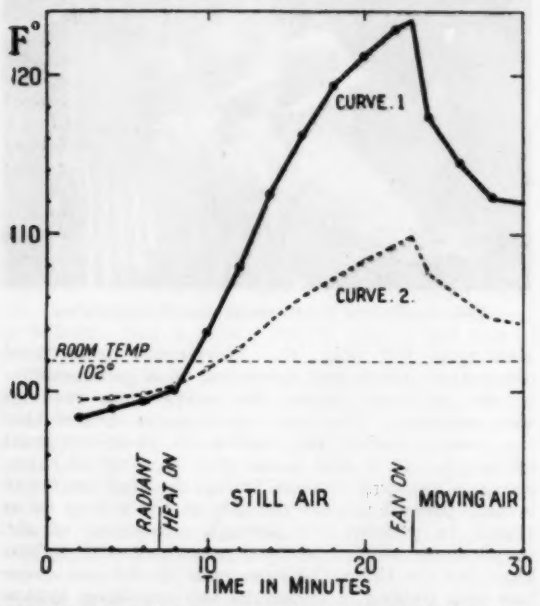

FIG. 7.—Curves showing temperatures taken ½ in. above scalp while topees were worn under identical conditions of radiant heat, air temperature, and air movement. Curve 1. Standard army service type with fabric lining. Curve 2. Similar helmet lined with aluminium foil and fitted with drop-lining of reinforced aluminium foil.

there was a good deal of air movement which tended to ventilate the topees and bring the temperature down. In spite of this lowering due to ventilation the reinforced foil linings produced a further lowering of 5–6°. Every degree above body temperature affects the human body materially, and this measure of increased protection against heat from the sun is of considerable importance. With greater radiant heat from the sun the advantage would have been more marked, but the tests carried out conclusively proved the value of the reinforced aluminium foil drop linings for increasing the protection already afforded by service topees.

It was evident that the linings must be made from durable material and that the reinforcing substance should be fabric, not paper. The manufacturers have now succeeded in making improved linings from material composed of aluminium foil firmly adhered to both sides of a light but strong fabric, and have fitted these linings to topees so that through ventilation is in no way impaired. Service topees in which these improvements have all been incorporated have been made, and I have tested them against service topees, similar in every respect except for the lining of aluminium foil and the drop lining of reinforced foil as shown in Fig. 5. The tests were carried out as before in the air conditioning room at the School of Hygiene, and the temperature curves shown in Fig. 7 clearly demonstrate the increased protection against radiant heat which can be obtained by making use of the properties of bright metallic foil.

FOOD-CONTAINERS

When in Egypt I was able also to test the application of the method of insulation to food-containers under conditions of desert heat.

Two tea chests were converted into food-containers. Box A and Box B were both lined with three-ply wood, leaving an air space of 1 inch, but in Box A the reinforced aluminium foil was fixed midway in the 1-inch air space between the inner and outer three-ply walls of the box. The lid of Box A was similarly insulated with reinforced aluminium foil and the internal surface of the box was covered with foil. Box B was of identical construction except that no aluminium foil was used. Box B served as a control.

A bucket containing a block of 16 lb. of ice was placed in each box at 10.30 A.M., and the boxes were left inside the pioneers' shop in which the temperature ranged from 95° to 100° F. At 9.15 A.M. next day—i.e., 23 hours afterwards—the boxes were opened and it was found that 7 lb. of unmelted ice still remained in Box A which was insulated with reinforced aluminium foil. All the ice had melted in the bucket in Box B. Box A was again examined after 48 hours, and it was found that although all the ice had melted the water in the bucket was still very cold.

These were only rough tests, but they showed that with an ice box of this simple construction one block of ice would last for approximately two days instead of two blocks of ice per day being used as at present.

These trials justified further experiments and more efficient insulated containers have been constructed. At shade temperatures which might be encountered in the tropics it has been found that 16 lb. of ice in these containers melts at the rate of rather less than ½ lb. per hour. Ice in an open bucket in the room at the same time melted at a rate of 4 lb. per hour, and ice in another food-container of identical construction, except that no aluminium foil was used, melted at a rate of 1 lb. per hour. From calculations it appears that the insulation provided was substantially better than if 2 in. of cork had been used.

The reinforced foil insulated box was also tested as a container for hot food or drink on the roof of the School of Hygiene on a cold day in February. An army dixie containing two gallons of boiling water, 212° F., was placed in the box. After four hours the temperature of the water had fallen to 135°, and after six hours to 126·5°. It was still a hot drink after six hours' exposure to cold open-air conditions. Another dixie containing two gallons of boiling water placed in the open near the box cooled to 126·6° in one hour.

CONCLUSION

Apart from the value of the various applications of reinforced foil insulation, as proved by the results of the tests and full-scale trials which have been carried out, it was a matter of no small importance to future research to have found confirmation in the field for experiments conducted under artificially produced tropical conditions in the laboratory at the School of Hygiene. Such confirmation of laboratory findings in the case of the method of insulation against heat and cold by reinforced aluminium foil justifies the belief that the use of the insulation for the purposes which have been briefly described in this paper will lead to increased comfort and improved living conditions, particularly where extremes of climate have to be faced.

I am greatly indebted to the Army authorities for facilities afforded me and to certain manufacturers, without whose coöperation and help it would not have been possible to carry this work to a practical conclusion.

MEDICINE AND THE LAW

General Medical Council: The Suspicion of Bias

INCONVENIENCE continues to arise at the disciplinary meetings of the General Medical Council when members are directed to withdraw and take no part in the proceedings because they belong to an organisation which is either bringing or resisting a complaint against a practitioner. A member of a tribunal should obviously be disqualified from adjudication if he has a personal or pecuniary interest or has taken any conscious part in instituting or advocating the proceedings. Mere membership of a defence society, however, seems to fall far short of giving grounds for suspecting bias in a member of the Council. We referred a fortnight ago to a case where seven out of 37 members of the Council present had to withdraw because defence societies were appearing both for and against the practitioner, and the seven happened to be members of one or the other. Even more recently, upon proceedings taken by the British Medical Association, 12 out of 28 members of the Council had to withdraw because they were members of the Association. This high proportion means more than inconvenience: it may be an injustice or—what in this connexion is the same thing—it may seem to be an injustice, and may be so felt by him whose professional career is at stake. The constitution of the General Medical Council has been deliberately fashioned with due regard for the representation of all interests and institutions. May he not feel the possibility of prejudice if wholesale withdrawals happen to deprive him of the presence of a particular group and threaten to deprive the tribunal of its representative character? The competence of his judges is no doubt a legal question, and the Council will naturally decline to run the risk of having its decisions nullified by the law courts, but there seems reason to think that the views of Lord Justice Fry in Leeson's case (the supposed authority for the present practice) may have received an almost extravagant respect. Sir Edward Fry, after all, delivered merely a dissenting judgment; he was in the minority, and the judgments of his two colleagues prevailed.

Leeson's case was a complaint by the Medical Defence Union. The general objects of the union at the time were stated to include the support and protection of medical practitioners, the promotion of honourable practice, the suppression or prosecution of unauthorised practitioners, the assistance of members in proceedings against them, and the promotion of legislation beneficial to the profession. Mr. Teale and Dr. Glover, two of the 29 members of the Council adjudicating in Leeson's case, were members of the union; neither was on the committee of management or had anything to do with making the complaint against Leeson. The latter's offence was found proved. He appealed, partly on the ground that two of his judges were interested parties, being members of the body which had prosecuted him. Mr. Justice North said the point was without substance. The two were not improper persons to sit on the inquiry. It was said they were members of a body for prosecuting in cases of misconduct, but they were equally members of a body for protecting the interests of practitioners; they were in fact perfectly neutral. The matter went to the Court of Appeal, where Lords Justices Cotton, Bowen, and Fry were sitting. Cotton, L.J., agreed with Mr. Justice North; neither Mr. Teale nor Dr. Glover had any voice at all in this prosecution or, on the evidence, knew anything about it before it came before them at the Council meeting. Bowen, L.J., was characteristically clear. If a man is an accuser, he must not be a judge; if he has a pecuniary interest in the success of the accusation, he must not be a judge. "But it must in all cases be a question of substance and of fact whether one of the judges has in truth been an accuser." Personally the Lord Justice regretted that the two gentlemen had not at once retired from the Council, because judges, like Cæsar's wife, must be above suspicion; but he held that, as a matter of substance and fact, they had not been accusers on this particular occasion.

Sir Edward Fry, a purist in all matters of conduct, took a different view. The defence society existed to prosecute. Mr. Teale and Dr. Glover were subscribers. Subscription to a body of this description implied a general sympathy with its objects and a confidence in the discretion of its managers. A body of such subscribers would not be a proper body of judges. There were, he said, other similar bodies formed to prosecute persons who infringed fishery rights or were cruel to animals and so on. Subscribers to such associations indicated their sympathy with the general proceedings and were "virtual prosecutors." He would himself account the decision of the Council in Leeson's case invalid; but, as the judgments of his two colleagues were the other way, Leeson's appeal was dismissed. This was in 1889, and in 1894 the majority judgment of the court was followed in Allinson's case, where Dr. Philipson, who represented the University of Durham on the Council, was a member of the Medical Defence Union which was taking a part in the proceedings. Allinson's appeal was dismissed by Collins, J., who said he was bound by the judgment in Leeson's case, even though "some of us might have wished that Lord Justice Fry's view had prevailed."

In the Court of Appeal Lord Esher pointed out that Dr. Philipson was a vice-president of the union and was ex officio a member of the committee to which was entrusted the authority to take proceedings, but he was only an ex officio member and did not in fact act as a member. Moreover, he had resigned his membership so as not to have to act. Davey, L.J., observed that, even if Sir Edward Fry's judgment were adopted in its most extreme application, he must decide that Dr. Philipson was not disqualified; he was not a party to the prosecution. Two other cases cast a little additional light on the legal position. In 1881 a man was punished at Deal by the mayor and justices for cruelty to a horse. The S.P.C.A. had prosecuted, and it turned out that the mayor and some of his brother justices were subscribers to the society. On appeal Field, J., held that these magistrates had not been prosecutors through their association with the society; general feelings of sympathy with the helpless counted for nothing. There was, said Cave, J., not even a suspicion of bias. An attempt had been made to suggest that the subscription involved a pecuniary interest in the prosecution. Collins, J., said that, although the society's funds might be liable for the costs or be benefited by a penalty, the subscribers would not thereby be affected.

This ruling was afterwards followed in 1897 when a magistrate who was a solicitor and a member of the Law Society adjudicated upon a prosecution brought by the Law Society against a man who had falsely pretended to be a solicitor. In the remote event of the Law Society being wound up, this magistrate might (said the judge on appeal) come in for a smaller sum of assets if the society had to pay the costs of the present prosecution; but there was no legal objection to this magistrate having adjudicated; he

was not prosecutor as well as judge. Do not these cases suggest that the withdrawals of members of the General Medical Council who are merely ordinary members of a defence society concerned in the case before them are unnecessarily scrupulous? The practitioner against whom the complaint is made could presumably waive any objection to members of the tribunal but he cannot be pressed to do so. In any event, the Council is not so strictly judicial a body as a court of law and the legal requirements of competence are less rigid than in the case of judges and magistrates.

There the matter remains. Meanwhile the members who are directed to withdraw must often feel that their exclusion is something of a slur upon their impartiality. If they know nothing about the case until it comes before them at the Council, they may well feel inclined to stay and perform their quasi-judicial duty rather than to walk outside. There is an ancient legal dictum that "favour shall not be presumed in a judge." Members of the General Medical Council are as much entitled to the benefit of the doubt as any other judges.

EXPERIMENTS ON LIVING ANIMALS

THE NEW GERMAN LAW

THE law for the protection of animals (*Tierschutzgesetz*), which came into force on Nov. 24th, 1933, in the German Reich, contains in Section III. regulations for the conduct of experiments on living animals.[1] In general all experiments which are associated with considerable pain or injury are forbidden on living animals for experimental purposes unless they are expressly permitted under the three following clauses:

(1) The Home Secretary may at the suggestion of the proper authorities give permission to certain scientific institutes or laboratories to undertake scientific experiments on living animals in so far as the scientific director possesses the necessary technical equipment and standing, the proper arrangements are available for the experiments, and guarantee is given for good attendance on the animals. The Home Secretary may delegate the granting of the permission to other high authorities. Permission can at any time be withdrawn without compensation.

(2) In carrying out the experiments the following regulations are to be observed: (i) The experiments may only be made under the full responsibility of the scientific director or of someone expressly nominated by him as deputy. (ii) The experiments may only be carried out by persons scientifically trained for them or under their direction, and only with avoidance of any pain not essential for the particular purpose. (iii) Experiments for research purposes are only to be undertaken if they give expectation of a definite result not yet established by science, or so far as they serve to clear up questions as yet unsolved. (iv) Unless in the judgment of the scientific director the object of the experiment positively excludes anæsthesia, or unless the pain associated with the operation is less than the discomfort entailed in the narcosis of the animal, experiments are only to be undertaken under narcosis. On the same unnarcotised animal no more than one severe operation or painful bloodless experiment is to be done. Animals which have to suffer any considerable pain after completion of severe experiment, especially one which involves an operation, are to be painlessly killed at once so far as in the judgment of the scientific director this is consistent with the object of the experiment. (v) Experiments on horses, dogs, cats, or apes may only be carried out when the object cannot be reached by experiments on other animals. (vi) No more animals may be used than are necessary for clearing up the particular question. (vii) Animal experiments for teaching purposes are only allowed if other teaching material—e.g., picture, model, preparation, film—is insufficient. (viii) Record is to be made of the animals employed, the object, the method, and the result of the experiments.

(3) These regulations are not applicable to animal experiments for determining the ends of justice, or for the inoculations and venesections of living animals for the purpose of determining disease in man or animals, or for obtaining or testing serums or vaccines according to processes already approved or officially recognised; but these animals also are to be painlessly killed at once if they have to suffer considerable pain and their despatch is consistent with the object of the experiment.

[1] It will be seen from the text of these regulations, for which we are indebted to the Deutsche medizinische Wochenschrift of Dec. 22nd, 1933, that the restrictions imposed follow rather closely those in force in this country.

POLAND

(FROM OUR OWN CORRESPONDENT)

POLAND lies between the Baltic and the Black Sea, between eastern and central Europe. Revived in 1918 as a Sovereign State, it has an area of some 389,000 sq. kilometres and a population of more than 32 millions—82·7 to the sq. kilometre. Agriculture and allied occupations are the livelihood of nearly two-thirds of the people. But although the country is not conspicuously rich in mineral resources, there are supplies enough for considerable development of its economic life. The most important of these raw materials is oil, the amount of which available to a depth of 1000 metres is conservatively estimated at 62,000 million tons. Iron, zinc, and lead are to be found in Upper Silesia, and there are quantities of sodium and potassium salts in the Carpathians. Of industries, the greatest is textiles, after which come the working of metal, wood, leather, and minerals, the manufacture of clothes, and building.

Poland is a Republic. At the head of the executive is the President, elected every seven years by a national assembly composed of 444 deputies and 111 members of the senate. The President rules through his ministers and through officials subordinate to them. There are at present 11 ministers, and since July, 1932, most of the questions relating to the health of the people have come within the province of the minister of social assistance, or have been referred to the department of public health, which has a medical director.

There are five divisions in this department, and all save the section of pharmacy are in charge of doctors. First comes the administrative section, which deals with the organisation of the public health service (Service de Santé), its personnel, and the inspections it undertakes. This section also superintends the work of public health societies and institutions, and provides medical aid for State employees. Next we have the section of hygiene engaged in the campaign against social diseases (tuberculosis, venereal diseases, cancer, alcoholism). It arranges for pre-natal and post-natal care, and is concerned with the questions of mental hygiene, clean food, drinking-water, and housing. A section for infectious diseases deals with vaccination, the investigation and control of epidemics,

disinfecting, and deratisation. A hospital and health resort section supervises the work of all medical establishments and thermal stations, and administers those belonging to the State. Lastly the section of pharmacy is responsible for all means of treatment and for the discipline of the pharmaceutical profession.

The health of school-children is looked after by the ministry of education; of prisoners by the ministry of justice; of soldiers by the ministry of war; and of travellers by the ministry of transport. It is laid down, however, that in principle all questions of public health come under the jurisdiction of the ministry of social assistance. The State institute of hygiene at Warsaw, its six branches at Lodz, Cracow, Lwow, Torun, Lublin, and Vilna, and seven institutes which control the sale of food are carried on under the department of public health.

The Republic is divided into 17 palatinates or provinces, and each of them has a section for social assistance and public health which is, roughly speaking, a provincial ministry for social assistance. It works under a doctor who is responsible directly to the voievode or head of the provincial government, but gets instructions on sanitary and professional questions straight from the Ministry. The palatinate is in turn subdivided into districts, of which in all Poland there are 241 rural and 21 urban. The number of inhabitants in a rural district is usually about 125,000. The chief administrative officer in the district is the starosta (sub-prefect) who is assisted among others by a district medical officer, subordinate in his official capacity to the starosta, but in his medical capacity to the section of social assistance and public health in his province.

A district is made up of urban and rural communes. When any important enterprise is on foot which has to do with public health several of these communes join to form a sanitary arrondissement, with a doctor of its own, who is paid either by the communes or by the district. The central administration tries to provide each of them with a clinic (centre d'hygiène) directed by the doctor appointed to the arrondissement.

INFECTIONS AND EPIDEMICS

From the epidemiological point of view the situation in Poland since 1923 may be regarded as normal—that is to say, the incidence of infectious diseases is the same as in other countries where conditions are similar. The notifiable diseases include plague, small-pox, cholera, typhoid fever, typhus, relapsing fever, dysentery, scarlet fever, diphtheria, cerebro-spinal fever, measles, erysipelas, whooping-cough, malaria, leprosy, tuberculosis, trachoma, trichinosis, rabies, and food poisoning. Contagious patients may be isolated by force, but if conditions are favourable the patient may insist on being nursed at home. Preventive inoculation has found many ardent supporters, but is compulsory only for small-pox, except in times of epidemic, when the authorities may insist upon vaccination against other diseases. It is largely employed against typhoid, paratyphoid, dysentery, cholera, scarlet fever, and diphtheria, and, as in other countries, it is given to the inmates of barracks, schools, mental hospitals, and poor-houses.

Cholera and *small-pox* have been wiped out, but the number of cases of *typhoid* notified annually is between 14,000 and 20,000, and in 1932 there was a notable increase here as elsewhere. There is probably no country where antityphoid inoculation has been practised more; thus in 1931 over 189,000 civilians were given vaccine, 18,000 by injection and the others by mouth, according to Besredka's method. The effects of the latter, however, have not been very encouraging, for among 171,000 vaccinated there have been 267 cases (0·14 per cent.) with 30 deaths. *Dysentery* is not rare, even in normal times, and of late has even become commoner. The organisms of Shiga and Kruse are most often found. *Typhus*, which gave so much trouble in Poland during the late war, is not yet extinct. Since 1919 there have been about 220,000 cases. The number fell regularly until there were only 1640 in 1930, but in the last two years it has risen again. It is seen chiefly in the eastern provinces and never in the west. Mobile units are sent immediately to the scene of any outbreak, and experiments on a large scale are being made with inoculation according to the method of Prof. Weigel of Lwow. The results are encouraging and the vaccine is in demand beyond our frontiers.

Poland may now be considered free of *relapsing fever*. *Diphtheria* has been growing commoner for several years—there were more than 18,000 cases in 1932—but the mortality is notably diminishing. Active immunisation is employed, and also, of course, serum. The number of cases of *scarlet fever* oscillates between 15,000 and 36,000, and since 1924 inoculation has been widely used—sometimes with anatoxin, sometimes with detoxicated vaccine, and sometimes with Gabryczewski's vaccine of the old type. No more than 100 cases of *poliomyelitis* are notified in the year, and it never assumes an epidemic character. Likewise, there are only a few hundred cases of *malaria* in the country. *Rabies* is not uncommon, particularly in the south, and in the last few years it has killed some 20–40 people, mostly unvaccinated. Since 1928 use has been made for human beings of phenolised vaccine made according to Semple's method. Inoculation of dogs which have been bitten is not allowed; they have to be destroyed.

PARIS

(FROM OUR OWN CORRESPONDENT)

MORTI-NATALITY IN FRANCE

IT appears from a paper recently published in the *Revue d'Hygiène*, by L. Cruveilhier, X. Leclainche, and M. Moine, that at the present time there are 26,000 deaths annually within the last six months of intra-uterine and the first three days of extra-uterine life. Comparable figures in other countries are not easy to find, but an instructive comparison may be made within France itself between different years, notably before and after the war. During 1911, 1912, and 1913 the annual morti-natality was 34,000, whereas for the years 1928–29 and 1930 the corresponding figure was only 26,000. This decline is reassuring as a whole. But when it is studied piecemeal the comparative backwardness of rural areas becomes evident. While the urban morti-natality per 1000 births, including stillbirths, fell from 54·5 in 1913 to 40·6 in 1931, the corresponding decline for rural areas was only from 38·5 to 31·6. In other words, there has been a fall of only 6·9 for rural areas as compared with 13·9 for urban areas. It would seem that legislative and social measures designed for the benefit of mother and child have been applied more effectively in the towns than in the country. However rare syphilis, for example, may be in rural areas, it is precisely here that it is most liable to be neglected to the great detriment of the unborn child. It has been calculated by Prof. Couvelaire that when the mother's syphilis is not treated the morti-natality is 72 per cent., 65 per cent., and 29 per cent., according as the disease has been contracted

during pregnancy, before pregnancy, or has been of old standing, perhaps even congenital. On the other hand, when the mother's syphilis is treated during pregnancy, the corresponding figures for the mortinatality in the above three categories are 27, 14, and 8·6 per cent. respectively.

TO EVERY TOWN ITS OWN MYCOLOGIST

It is obvious that the consumption of mushrooms would go up by leaps and bounds if the public felt sure that toadstools were never offered in their place. As most fruits and vegetables, even the haricot bean, have their poisonous counterparts, it seems unwarrantable that they should all be enjoyed without scruples while mushrooms are looked at askance by so many. This problem was discussed some years ago at the general assembly of the Société Mycologique de France, which passed a resolution in favour of the institution of *offices mycologiques* in charge of competent specialists for every community of importance. The president of this society, Mr. Martin-Claude, has discussed the tangible sequels to this resolution passed at Lyons in 1922. Here and there in France enterprising municipalities have taken the hint and appointed mycological specialists to teach the public not only how to distinguish the edible from the poisonous mycological products, but also how to conserve the former and, in general, take a culinary, commercial, and botanical interest in them. There are already in force in Paris regulations governing the sale and handling of wild mushrooms, which must be intact in order that their identification by the potential purchaser may be facilitated. It is also forbidden to offer for sale in the same lot a mixture of different species of mushrooms. The universal enforcement of these two regulations should, in the opinion of Mr. Martin-Claude, be supplemented by other provisions. He would like, for example, to see the sale of mushrooms confined to a special quarter of a town or market in order that sellers and buyers might meet under the scrutinising eye of an expert. Were the itinerant vendor, wholesale or retail, to be eliminated by such a measure, and his goods made to pass through the bottle-neck of the special mushroom quarter of the town, the chances of poisonous fungi escaping detection would be much reduced. In small communities the mushroom inspector could hardly be expected to possess the knowledge of a university professor of botany; his mushroom activities would necessarily be part-time, and his differential diagnosis limited to the more common fungi.

SANATORIUM TREATMENT UPHELD

The Academy of Medicine has come down on the side of the sanatorium. The discussions at the Academy last year on the place of the sanatorium in the treatment of tuberculosis led to the appointment of a commission of inquiry, composed of such well-known authorities on tuberculosis as Marfan, Bezançon, Sergent, Léon Bernard, and Rist. It is unanimous in finding no justification for regarding ambulatory and other methods of treatment (artificial pulmonary collapse, &c.) as competitors of sanatorium treatment. "Sanatorium treatment, consisting essentially of methodical aeration and rest, supervised in a closed establishment situated in a favourable climate, maintains the value with which experience has credited it, and remains the most useful supplement to other treatments whose full effect is thereby assured." The commission goes on to recommend the sanatorium for those who are not wealthy as being equally necessary from a prophylactic as from a therapeutic point of view. The sanatorium should be the centre where the patient can benefit simultaneously from all the modern and highly technical methods of treatment. To those familiar with modern sanatorium treatment the commission's verdict may seem a string of platitudes. Yet so far from being a superfluous enunciation of generally accepted truths, it comes as a much needed corrective to the view that medicinal and surgical treatment can now cure tuberculosis while you wait.

HOUSING PROBLEMS

Before the war the fortifications surrounding Paris were ringed by a glacis on which no man might build. The demonstration of the futility of these fortifications under modern conditions of warfare converted this glacis into a Tom Tiddler's ground on which claims were pegged and shanties sprouted overnight. The authorities had been caught napping. The result was the creation of a slum area bristling with vested interests, the strength of which depended on numbers rather than length of tenure. The authorities have done their best to remedy this state of affairs by certain measures which include the building of large subsidised tenement houses in the old fortified area. These houses, called *habitations à bon marché*, have proved very disappointing from many points of view. The mortality is, apparently, as high in them as in the slums, and in 1931 there were 1515 cases of infectious disease among the 8000 families lodged in them. Many of their occupants are tuberculous war pensioners, and in 1931 tuberculosis was responsible for 42 per cent. of the 316 deaths. The notification of tuberculosis is not now compulsory in France, and the regulations governing these houses do not provide for the exclusion of the tuberculous. These evils, for which it is most difficult to find a remedy, have been exposed by Dr. H. Roueche in the *Siècle Médical*. Where there should be parks and playgrounds there are these enormous caravanseries which favour the spread of infectious diseases, and which, unlike the bungaloid growth, cannot be swept away except at a prohibitive cost. It is to be hoped that the unsanitary standards of living of the inhabitants of these houses have less solid foundations than the buildings themselves, and that an educational campaign in the elements of hygiene will ultimately solve this problem.

IRELAND

(FROM OUR OWN CORRESPONDENT)

NATIONAL HEALTH INSURANCE

THE first step toward amalgamation of the several approved societies operating in the Irish Free State was taken on Jan. 1st, when sections of the societies, with an aggregate membership of 143,000, were transferred to the unified society. Details regarding the scheme of unification were given last week by broadcast by Mr. D. O'Donovan, chairman of the Unified Society. He said that there were 65 approved societies, with a membership ranging from 60 to 90,000, and totalling some 450,000. It was intended that a larger batch of societies would be absorbed in the near future, and he hoped the amalgamation would be completed in a year or 18 months. Unification would make possible a more economical and more efficient system of administration. The character of the membership of the 65 societies varied from societies with select lives, enjoying good conditions of employment, to societies with bad or poor lives, subject to an undue degree of unemployment. A system of administration by so many rival overlapping

organisations, with different standards and different types of membership, could not be regarded as truly national. A national scheme should go as far as possible to provide equal benefits for all, with a uniform standard of administration. The strong should help the weak, as in other insurance schemes.

The chairman might have added that a system of insurance which does nothing to care for the health of the insured is not truly a health insurance. The absence of any provision of medical treatment has taken away any reality from "National Health Insurance" in the Irish Free State. The amalgamation of approved societies, while it is admitted that it is likely to lead to greater economy or efficiency, does not in every way commend itself to the medical profession. The societies have up to the present shown little desire to coöperate with the profession, and the association of their powers leaves medical men somewhat uneasy.

PUBLIC HEALTH SERVICES

THE LOCAL LEGISLATION OF 1933

THE 92 Local Acts which were passed in 1933 (or, to be exact, in the Parliamentary session ending last November) provide material for a survey of annual developments in public health legislation in the local field. The bulk of these enactments are of regular pattern already found satisfactory elsewhere, but progressive local authorities are constantly obtaining enlarged powers, and the resultant clauses furnish useful precedents. The new Essex County Council Act, for instance, enables county districts to make by-laws to secure the cleanliness of hairdressers' and barbers' premises, and of the instruments, towels, and materials used therein. Middlesbrough has taken like powers and requires compulsory registration of such premises. Houseboats are to be registered in the area of the City of London; by-laws may prescribe the minimum number of occupants in relation to cubic air space, may require sanitary conveniences and appliances, and may promote cleanliness and habitable condition, the prevention of the spread of infectious disease, and the restriction of nuisances. Mention of nuisance brings us to provisions against noise in the Acts of nine other localities; these derive apparently from the Edinburgh precedent of 1930. There are restrictions too on the crying of newspapers on Sundays, on noisy salesmen in markets (at Barking), and on the tolling of funeral bells (in the Wimbledon cemetery), as well as the usual clauses about silencers for stationary internal combustion engines. Along with familiar powers for discontinuance of offensive trades there is provision for municipal purchase of slaughter-houses (at Norwich, Worksop, and Barking). A novel clause in the Plympton St. Mary Act enables a condition to be inserted in a slaughter-house licence "specifying and limiting the number of animals to be slaughtered in any one day" in relation to the accommodation available. Another novelty is the Worksop section which applies the Public Health (Meat) Regulations of 1924 to the slaughtering of an animal in any hotel, hostel, institution, boarding school, or public school in the borough as though the meat were intended for sale for human consumption and as if the premises were a slaughter-house. By-laws in Essex may in future require the licensees of knackers' yards to keep records and registers of beasts and carcasses.

FOOD-SUPPLY

There are the usual clauses about meat in several localities—for instance, for registering the purveyors and their premises (at Wigan), inspection, restriction on conveyance in open carts (at St. Helens), prohibition of inflating carcasses, exclusion of emaciated and diseased beasts from markets (at Oxford), and slaughter of animals unfit for human food (at Worksop and Middlesbrough). With regard to food in general, there is no need to dwell on well-tried powers for controlling manufacture, preparation, storage, transport, and exposure for sale, powers of searching vehicles and baskets, exclusion of infected persons (and especially tuberculous patients) from the business of food-supply, or the time-honoured provisions about ice-cream and potted meat. At Norwich the authority to take samples from premises where food is sold or prepared or stored for sale is extended to yards. There is restriction at Durham and Worksop on the introduction of inedible fats where food is prepared. Worksop and Bridlington have instituted special control of fried fish shops, and at Colne there must be fire-extinguishing apparatus where heated or boiling fat or oil is used for cooking fish and potatoes. Food poisoning is notifiable by medical practitioners at Oxford, Rugby, Worksop, Barking, Bridlington, Plympton St. Mary, and Middlesbrough.

INFECTIOUS DISEASES

Norwich has a striking new clause about infectious disease attributable to oysters or other shell-fish from particular oyster-beds or other places or to watercress from a particular source. The medical officer of health who anticipates risk may report to the corporation, and the vendor may then be called upon to appear within not less than 24 hours and to show cause why he should not be ordered to cease his sales from the suspected source. If the order is made, there is a £5 penalty for its infringement; the Minister of Health must be notified, and the vendor is excused from legal liabilities for breach of contract. Elsewhere there are such common clauses about infectious diseases as the local extension of the expression "infectious disease" for various purposes, the supply of antidotes, compensation for persons ceasing employment, the removal of dead bodies and infectious patients, the medical officer's power of entering premises and obtaining information, and the right to ascertain laundrymen's names or, as at Middlesbrough, lists of dairymen's customers, the notification of schoolmasters by parents, the emergency closing of Sunday schools, and so on. The Essex Act authorises the establishment of a laboratory "for the purpose of the diagnosis and prevention of infectious diseases, and for the examination of specimens": for this purpose the council may provide buildings and staff and enter into agreements for the making of bacteriological and other examinations. The Middlesbrough Act extends to premises not used for human habitation, Section 45 of the Public Health Act, 1925, as to cleansing, disinfecting, or destroying vermin-infested articles; it also applies Section 48 of that statute (cleansing of verminous persons) not only to persons who are in a foul and filthy condition, but also to those who suffer from any contagious or infectious disease of the skin.

HOUSING AND SANITATION

Among housing and town-planning provisions Section 64 of the Salford Act seems novel. A previous

enactment, requiring food storage accommodation in dwelling-houses, is applied to any new or converted building which contains two or more flats or separate dwellings as though each flat or separate dwelling were a dwelling-house. Barking takes powers to ensure that lock-up shops, workshops, sheds, or places of business shall not be improperly used as dwelling-houses. The important problem of movable dwellings and camping grounds (dealt with by Surrey in 1931) has fresh treatment in Part IX. of the Essex Act. In urban districts over 20,000, and in the Brentwood district, movable dwellings are not to be placed or kept on any land without previous approval by the district council; no one without its consent may let or permit the use of lands for occupation by a movable dwelling till the ground is properly equipped with roads, sewers, and water-supply. This restriction is whittled down by words which exclude movable dwellings not used or intended for use by the occupier as the sole or principal means of habitation for an unbroken period of at least three months. Essex provides for amenities as well as health by copying recent precedents for controlling ribbon development along important roads; the roads include specified by-pass routes and the proposed North Orbital Road. The Salford Corporation has been obliged to take power to order the vacation of houses on land liable to subsidence. The Act has also a novel section authorising the closing of a street for specified periods on each day or on certain days to enable it to be used as a playground for children. As regards drains and sewers the Colne Corporation may now repair them by agreement, and at Hull the corporation can now cleanse sinks and gullies at the owner's request and expense. At Middlesbrough the removal (temporarily or for renewal) of the pan or basin of a water-closet is to be deemed a reconstruction of a drain within Section 39 of the 1925 Public Health Act, the local authority being thus entitled to have notice and to expect. Norwich has a new section which will check the discharge into sewers or drains of (*a*) grease and fat from a club, hotel, public-house, inn, slaughter-house, butcher's shop, or fried fish shop, or (*b*) oil or grease from a stable, garage, or motor works.

HOSPITALS AND MEDICAL TREATMENT

Local medical practitioners will already be aware of the recent Acts which have allowed pay-beds at the Cancer Hospital, the Manchester Royal Infirmary, and the Samaritan Free Hospital for Women. These are signs of the times. The statutory objects of the Victoria Infirmary of Glasgow have been altered to allow the treatment of patients from Glasgow or elsewhere, "whatever be their means," who are willing to pay such charges as the governors fix, provided that not more than one-fifth of the accommodation is occupied by paying patients; there is also fresh provision for "workmen's governors." At Hull the corporation is to provide hospital facilities and treatment for employees engaged on the water-works; this clause, though rare, seems not to be unprecedented. Doctors will be interested in those parts of the Essex, Wimbledon, and Salford Acts which are headed "Establishments for Massage and Special Treatment." Treatment here includes "radiant heat, light, electric, vapour or other baths for therapeutic treatment or other similar treatment." No unlicensed person may conduct such establishments. Applicants for licences must declare their age, nationality, and technical qualifications, and the extent of their interest in similar institutions elsewhere. The licence is revocable (and its renewal may be refused) for unsuitability of the licensee, or his premises, or for the absence of "reasonably necessary" technical qualifications on the part of the staff. Municipal by-laws may prescribe the qualifications. These restrictions do not apply to municipal establishments or recognised hospitals and nursing-homes. There is also an exception for the certificated establishments of registered medical practitioners, but the machinery for obtaining exemption has been criticised (THE LANCET, 1933, ii., 602). Lastly, we may notice Section 184 of the Essex Act which improves upon the Nursing Homes Registration Act, 1927. Section 4 of the latter statute is enlarged so that district councils may be allowed to make by-laws for (*a*) regulating the admission into a nursing-home of a patient suffering from infectious disease, (*b*) taking precautions in infectious cases, and (*c*) requiring the county medical officer to be notified of (i) an infectious disease occurring in a registered home, or (ii) a rise in the temperature of a maternity patient to 100·4° F. for 24 hours or its recurrence within that period.

SCOPE AND FORM

The comprehensive index to the Local and Private Acts of the session, published by H.M. Stationery Office (2*s.* net), shows the wide range of local authorities' activity in other directions than public health—the development, for instance, of transport services or of gas, water, and electricity supply, the establishment of aerodromes and golf courses, or the control of petroleum-filling stations. With these we are not concerned. A study of the text of this voluminous local legislation suggests a few final questions. The Middlesbrough Corporation Act, nearly 300 pages long, replaces all outstanding enactments with a single orderly document; are there not other authorities which might follow this laudable example? And why is it that the form of the local Acts is inferior to that of the Public General Statutes? Even if punctuation is an artificial matter which the judges can ignore in interpreting an enactment, why are there no commas from the beginning to the end of a Local Act? And why is the reader not helped by the insertion of marginal "shoulder notes" to indicate the number of the part or schedule to which a particular page belongs? This improvement has for several years been made in the text of the Public General Acts, and it greatly facilitates reference.

AMŒBIC DYSENTERY AND FOOD HANDLERS

IT has long been known that a proportion of the healthy population, even in the temperate zone, are carriers of *Entamœba histolytica*. Thus in the United States it has been estimated that 8 to 10 per cent. of the population as a whole are infected, while in England of 3146 soldiers, who had never been out of the country, 3·4 per cent. were found to be "contact carriers." In both countries amœbic dysentery is notifiable to the public health authorities but very few cases are reported and the disease has not presented a serious problem of public health. Recent events in Chicago, however, show that even in non-tropical countries outbreaks may occur in epidemic form.[1] The notifications of amœbic dysentery to the Chicago board of health average one or two monthly. On August 15th, 1933, two cases were reported in which the patients were both found to have eaten at a certain hotel. With commendable promptitude the entire staff of 364 food-handlers at the hotel was

[1] Bundesen, H. N., Rawlings, I. D., and Fishbein, W. I.: Jour. Amer. Med. Assoc., Nov. 18th, 1933, p. 1636.

investigated and, by Sept. 1st, 15 clinical cases of amœbic dysentery and 11 carriers were discovered among them. Seven weeks later a second examination revealed 60 more carriers, while out of 498 persons other than food-handlers 100 had *E. histolytica* in their stools. Cultural as well as direct microscopical methods were used for this second investigation. By the beginning of November there had been 185 cases with 19 deaths, and 193 carriers had been discovered.

In 1927 seven or eight cases of amœbic dysentery had been found in a large hotel and the 1933 outbreak may possibly be traceable to an employee, then found to be a carrier, who had moved to the now affected hotel. He had had a thorough course of treatment and many negative laboratory tests, but his case (if it was a recurrence and not a reinfestation) suggests doubts about the wisdom of ever allowing a food-handler known to have suffered from amœbiasis to return to his occupation. That the excreta should be examined every six months in such cases seems a necessary precaution.

The immediate measures adopted for control of the outbreak [2] consisted in the isolation and treatment of all cases and carriers among the food-handling staff, with strict hand-washing and disinfecting regulations and general cleaning and painting of the kitchens "to promote the psychology of cleanliness." These measures seem to have been successful in preventing further cases but, unfortunately, very large numbers of guests had been passing through the hotel in consequence of the World Fair held in Chicago last summer. It was decided to send out 22,000 questionnaires asking for information as to any illness during or after a visit to Chicago, and in the 3490 replies received there were 180 reports of illnesses, this being definite or suspected amœbic dysentery in about 100. That the disease may have been spread over a wide area is shown by an account of nine cases admitted to "an average hospital of a northern State" in all of which the infection probably originated in Chicago.[3] An analysis of these cases reveals several points of interest. In the first place they all belonged to what is described as "the higher social circle" and their hygienic habits were presumably good. They showed the characteristic diversity of signs and symptoms at the onset.[4] One case, in a child of 10 years, suggested an "acute abdomen"; two revealed masses, one in the rectum and one in the cæcum, suggesting new growths; one had been treated for some time as "colitis"; three were typical clinical cases of amœbic dysentery with varying degrees of severity. The appearance of the stools was valuable; even the first stool in six of the nine cases showed blood and mucus to the naked-eye examination. The incubation period varied from 7–15 days to 74–77 days. The number of days from the probable date of onset to the date of diagnosis varied from 1 to 125.

The fundamental difficulty in the epidemiology of amœbiasis is that no one knows why, of two persons infected with *E. histolytica*, one should develop dysentery while the other merely becomes a carrier. It has been said that the entamœba is of uniform virulence and a secondary or symbiotic bacterial infection has been suggested as accounting for the symptoms. On the other hand, there is now evidence from a study of amœbiasis in Tennessee [5] that strains may vary in virulence. The practical difficulties come from the fact that diagnosis must depend on a laboratory investigation needing technical skill and judgment and that the clinical picture may not suggest to the attendant physician that he should get this investigation undertaken. Like many other diseases it is not likely to be missed if the possibility of it is kept in mind, and the American experiences should conduce to this. So far as public health control in England is concerned there is perhaps less likelihood of an outbreak here; but should one arise the means of checking it would be less effective than in Chicago. No distinction is made in our notification scheme between amœbic and bacillary dysentery, nor are there powers available for the routine examination of food-handlers.

[2] Tonney, F. O., Hoeft, G. L., and Spector, Bertha K.: Ibid., p. 1638.
[3] Ikeda, K.: Ibid., Dec. 16th, 1933, p. 1944.
[4] See THE LANCET, 1931, ii., 1419.
[5] Frye, W. E., and Meleney, H. E.: Amer. Jour. Hyg., November, 1933, p. 543.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED DEC. 23RD, 1933

Notifications.—The following cases of infectious disease were notified during the week: Small-pox, 9 (last week 4); scarlet fever, 3607; diphtheria, 1223; enteric fever, 15; acute pneumonia (primary or influenzal), 1414; puerperal fever, 41; puerperal pyrexia, 104; cerebro-spinal fever, 21; acute polio-myelitis, 5; acute polio-encephalitis, 3; encephalitis lethargica, 5; dysentery, 31; ophthalmia neonatorum, 59. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on Dec. 26th–27th was as follows: Small-pox 13 under treatment, 0 under observation (last week 16 and 2 respectively); scarlet fever, 2803; diphtheria, 2026; enteric fever, 15; measles, 625; whooping-cough, 203; puerperal fever, 14 mothers (plus 8 babies); encephalitis lethargica, 257; poliomyelitis, 4; "other diseases," 269. At St. Margaret's Hospital there were 17 babies (plus 12 mothers) with ophthalmia neonatorum.

Deaths.—In 118 great towns, including London, there was no death from small-pox or enteric fever, 45 (14) from measles, 17 (6) from scarlet fever, 26 (4) from whooping-cough, 56 (11) from diphtheria, 44 (12) from diarrhœa and enteritis under two years, and 97 (14) from influenza. The figures in parentheses are those for London itself.

Manchester reported 7 deaths from measles, Barrow-in-Furness 4, Leeds and Liverpool each 3. Liverpool reported 3 deaths from scarlet fever. Six fatal cases of whooping-cough occurred at Manchester, 5 at Liverpool. Six deaths were attributed to influenza at Manchester and Birmingham, 5 at Bristol, 4 each at West Ham, Liverpool, and Rhondda. Of the fatal cases of diphtheria, 7 were reported from Liverpool, 3 each from West Ham, Hull, Leeds, and Manchester.

The number of stillbirths notified during the week was 261 (corresponding to a rate of 47 per 1000 total births), including 37 in London.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE

THE following appointment is notified: Surg. Capt. G. G. Vickery to *President*.

ROYAL ARMY MEDICAL CORPS

Lt. D. P. F. Mulvaney to be Capt.

RESERVE OF OFFICERS

Maj. M. Sinclair, having attained the age limit of liability to recall, ceases to belong to the Res. of Off.

TERRITORIAL ARMY

Lts. R. Lodge and J. C. McFarland to be Capts.

TERRITORIAL ARMY RESERVE OF OFFICERS

Capt. A. Gough, having attained the age limit, relinquishes his commn. and retains his rank.

ROYAL AIR FORCE

The following half-yearly promotions have been made: Group Capts. to be Air Commodores: A. W. Iredell and A. V. J. Richardson.

INDIAN MEDICAL SERVICE

Lt. L. O'Neill to be Capt.

Capt. G. L. Kohli relinquishes his temp. commn.

The undermentioned officers relinquish their prob. appts.: Lts. (on prob.) F. I. Ashton and J. F. J. Doyle.

CORRESPONDENCE

PROSTATIC RESECTION

To the Editor of THE LANCET

SIR,—I have read with great interest the annotation on prostatic resection in your last issue (p. 1494). It seems to me that the crux of the whole question is whether Caulk's much quoted statement, that "after removal of a portion of the prostate the remainder of the gland tends to shrink," is correct or not. If it is correct, one could promise a fair expectation of permanent relief, but if the remainder of the gland continues to develop obstruction must inevitably recur.

I have done a prostatectomy on eight patients who had previously undergone resection. The interval between the two operations varied from one to three years. Examination of these prostates showed that the glandular tissue immediately behind the urethra was either entirely absent or reduced to a comparatively small amount. On the other hand, atrophic or regressive changes could not be detected in the lateral lobes. They showed no variation from the typical microscopic appearances of benign hypertrophy. This series is of course insufficient to disprove Caulk's dictum, but, I think, is sufficient to cast some doubt upon it. I would be very grateful if any of your readers would send me sections of prostates they have enucleated after perurethral resection had been tried. The only stipulation I make is that at least a year should elapse between the two operations. This would give ample time for any inflammatory reaction to settle down.

It is obvious that a dictum such as Caulk's should not be accepted until it had been substantiated by the microscopic examination of a large number of specimens, as it is contrary to the accepted rule of pathology that after the partial removal of any tumour the remainder continues to grow. There is no a-priori reason why this should not be true of prostatic adenomata.—I am, Sir, yours faithfully,

Harley-street, W., Jan. 1st, 1934. J. SWIFT JOLY.

SUPRARENAL TRANSPLANTATION

To the Editor of THE LANCET

SIR,—Mr. Frank d'Abreu, in a paper on the transplantation of the suprarenal glands in the treatment of Addison's disease which appeared in your issue of Dec. 30th, 1933, quotes three previous cases in which this has been done. As it is impossible to be certain of the diagnosis of Addison's disease without confirmation by autopsy, none of the three cases as reported can be regarded as conclusive. This is shown very well by the later history of the first case. When I showed this patient at the clinical section of the Royal Society of Medicine in 1922 nobody doubted the diagnosis, yet when he died eighteen months later the suprarenal glands were perfectly normal. His case is recorded in full by Dr. J. J. Conybeare on page 373 of *Guy's Hospital Reports* for 1924. The following is an abstract of his history:—

Charles C., aged 41, began to suffer from increasing asthenia in January, 1920, with occasional attacks of vomiting. At the same time it was noticed that he was becoming pigmented, and when first seen at Guy's Hospital in November, 1920, he was diagnosed as a case of Addison's disease. He then showed marked general pigmentation, including small patches in the mouth. The spleen and liver were palpable. When first seen the blood pressure was 120 mm., but while under observation it fell to 80 mm. By January, 1921, he was constantly vomiting, and was so weak that he was unable to sit up in bed. A test-meal showed complete achlorhydria. His red cells numbered 5,120,000 per c.mm., and the hæmoglobin percentage was 80. In March, 1921, a suprarenal gland removed from a man who had just died as the result of an accident was grafted into the subcutaneous tissue of the abdomen.

The wound unfortunately became septic, and in April, 1921, a further graft, removed from a fœtus just after death, was inserted into the substance of the left testicle. The patient subsequently developed severe anæmia, the hæmoglobin falling to 28 per cent. in May, 1921. He was given a blood transfusion and steadily improved as regards his general condition and the anæmia, and the blood pressure rose to 115 mm. by February, 1922, although the pigmentation remained unchanged. The case was now considered to be one of Addison's disease in conjunction with Addison's anæmia, and when shown at the Royal Society of Medicine in February, 1922, he was generally accepted by those who saw him as a genuine case of the disease showing great benefit from a suprarenal graft. The vomiting had ceased, and he was so much stronger that he had recently been able to return to his work as a motor-bus driver. The systolic blood pressure was 115 mm. and the hæmoglobin percentage 80. The suprarenal gland was palpable, but the testis had partially atrophied. The blood pressure remained between 100 and 120 mm. during this time.

In June, 1923, he was readmitted to Guy's Hospital more deeply pigmented than ever, with very marked asthenia and a blood pressure of 90 mm. He had again developed severe anæmia with 30 per cent. hæmoglobin and a red cell count of 1,200,000 per c.mm. The blood picture now resembled that of Addison's anæmia. The spleen and liver were still palpable and hard. He had also considerable ascites. As there was no improvement the spleen was removed, but the patient died shortly afterwards. No excess of iron could be demonstrated in the spleen.

At autopsy the suprarenals were found to be perfectly normal, both by naked-eye and microscopical examination. The liver was markedly cirrhotic and gave the ferricyanide reaction. Examination of the left testicle, into which the fœtal suprarenal had been grafted about two years previously, showed replacement of the testicular substance by fibrous tissue, with no evidence of any suprarenal tissue on microscopic examination.

In reviewing this case it is difficult to believe that the extraordinary improvement in the patient's condition was not at any rate in part due to the suprarenal graft; the universal pigmentation, low blood pressure, extreme asthenia, and vomiting having been due to functional deficiency of the suprarenal glands. I am, Sir, yours faithfully,

New Lodge Clinic, Dec. 30th. ARTHUR F. HURST.

ROYAL MEDICAL BENEVOLENT FUND

THE CHRISTMAS APPEAL

To the Editor of THE LANCET

SIR,—I wish to take the first opportunity of informing you that the sum of £663 19*s.* 6*d.* has been received in response to my appeal for the Christmas gift fund of the Royal Medical Benevolent Fund. May I ask that my acknowledgment and grateful thanks be conveyed to your readers?

It will be a matter of satisfaction to you, Sir, to know that, owing to the very generous and whole-hearted support of many friends, we were able to send a Christmas gift of 30*s.* each this year to all in need of it, both annuitants and grantees. I feel particularly indebted to all who brought my appeal to the notice of various committees and societies, and held collections, which action so very materially assisted in making the appeal successful.

I am, Sir, yours faithfully,

THOS. BARLOW, President.

11, Chandos-street, Cavendish-square, W., Jan. 2nd, 1934.

OSTEOPATHY

To the Editor of THE LANCET

SIR,—Recent correspondence in the *Times* on this subject makes timely an attempt to summarise the situation from a medical point of view as concisely as possible.

Reviewing the correspondence it would appear as if treatment by joint manipulation were, in the lay mind, almost exclusively confined to the practice of those who do not hold a medical qualification, but this is not so. Within the ranks of our profession are those who have been studying the movements of joints and joint manipulation for very many years past, and many now make a regular practice of using and teaching the art of manipulation in the physical treatment and orthopædic departments of most of our larger hospitals. Naturally they also make use of it in private practice. Osteopathy is a branch of physical treatment which professes to secure relief from symptoms, and to serve the purposes of prophylaxis, as the result only of manipulation. If this were all, the problem would be a simple one, but unfortunately the claims made by the osteopath do not cease here. He claims further that joint manipulation is a system of healing, apparently almost regardless of the pathological conditions which are present. The extent to which this claim is made seems to vary in different schools; but in some, at any rate, it is believed, if not actually taught, that the human frame would be immune against attacks of infection and disease if it were not for the fact that vitality is lowered locally by some joint "lesion" in the spinal column. Hence it comes about that those who hold this view believe that the correct treatment for almost every form of breakdown, which comes under the heading of illness or ailment, should be treated by manipulation, so that the lowering of resistance at any individual point may be restored, and thus the effects of infection, injury, or disease be overcome.

Orthopædic surgeons and medical men who specialise in physical treatment know and are willing to testify to the potency of the remedy of joint manipulation, and they also know that, when this remedy is required to bring relief, no other treatment is of any avail. Equally they know, as the result of their general training, that there are countless other conditions for which treatment on these lines is utterly unavailing. Fortunately they are aware that joint manipulation is not by any means the only remedy they have at their disposal, and many a patient passes through their hands daily in whom manipulative treatment is not only futile but often retards recovery. It may even prove to be dangerous. Then, when it is right and proper to prescribe physical treatment for these patients, other forms are available: massage, exercise, heat, light, baths, and electricity in all their various forms. Suitably prescribed, each may prove a sovereign remedy or one may succeed another during the varying stages of recovery; but none can replace manipulation if this is needed, any more than manipulation can replace any one of the others if it is needed. Also there remains a vast number of cases for which physical treatment of any sort is contra-indicated, and still more for which it should take a secondary place. Even so, there still remains a place (a large and, to the individual concerned, an all-important place) for manipulative treatment. Nothing can replace it when it is required.

There are two points often forgotten by medical men and laity alike. First, so great is the wonderful recuperative power of nature that treatment so-called must often be excessively bad before it will prevent recovery, however much it may retard it. Secondly, any honest man will be prepared to testify that he has known patients who have recovered, not because of treatment, but in spite of it. Take, as example, a case of German measles. When manipulative treatment is given, the rash will disappear quickly, and recovery soon takes place. The same would be true if no manipulation had been given. The "treatment" is innocuous for good or ill. But if a patient has pain in his leg or arm on movement, it may be that manipulation will effect a so-called miracle cure, if it has been caused by a locking of, or loss of mobility in, a joint. If it is due to tubercular disease of the joint, similar treatment may kill the patient. Admittedly these are two extreme examples, but every case approximates to one or the other. What conclusion, therefore, is it possible to form? Surely only this, that if a man or woman is to be allowed to prescribe treatment, it is essential that the widest possible knowledge and experience, not only of physical treatment, but of all other methods of aiding the process of healing, should be available. Otherwise what happens? The treatment given may, as we have seen, do no good, or it may do harm, or (more often) treatment which might otherwise have been efficacious is withheld—perhaps too long to be of any avail. Also, anyone who has at his disposal only one method of treatment, and is ignorant of all others, is liable to place too great a reliance on the one egg in his one basket. He therefore is driven to attempt the impossible—being ignorant of other methods of treatment he may not realise this—and so encourages hope unjustifiably. Then comes the tragedy, an end that every practitioner of physical medicine must see almost daily. "Treatment" was started, some apparent improvement followed, then ceased. The manipulator yielded to temptation, became more vigorous in his ministrations, and presently did—perhaps irreparable—harm, which the qualified practitioner is asked to remedy, it may be, if fortune is kind, by some such simple means as the removal of a tooth or tonsil.

Often enough the manipulator does good, and the medical profession has been held up to obliquy because it has refrained from prescribing this treatment for cases in which the sequel has proved that it was the appropriate remedy. But let us remember this: the duty of the medical man is to point the road to cure, if he can, but still more is it his duty to refrain from prescribing any treatment that entails unjustifiable risks; and medical men are more than justified in refraining from recommending a patient to go for treatment to one of whose training, skill, and experience he has no knowledge, let alone to one of whose teaching he has a profound distrust. Twenty-five years ago physical treatment was in its infancy. Not all forms of it were free from risk or danger. Until, therefore, it was possible, by patient research and study, to work out the rationale of the various types of treatment according to the known laws of anatomy, physiology, pathology, and psychology, it was impossible to put treatment by manipulation on a scientific basis. During the years that have passed this has been done, and now not only do practitioners of physical medicine and others practise the art of joint manipulation, but they are able to explain what it is they do and, in part at least, why success attends their efforts. The spreading of this knowledge is still advancing, but only of recent years has it been adequate to render manipulative treatment comparatively safe—free from that element of risk which rendered it unwise for medical men, or anyone else, to prescribe it freely, let alone indiscriminately.

Safety first was the guiding rule. If a man wishes to be a surgeon, the law, quite rightly, compels him to study medicine, pharmacology, obstetrics, gynæcology, and all branches of medical science. Then and then only does the law recognise him as fit to practise surgery. So too, the would-be consulting physician has to study and pass examinations in surgery. Surely it is not asking too much of those who would practise *and* prescribe physical treatment that they should do the same. If not, let those who would only practise it follow the example of the members of the honoured and honourable profession of massage, many of whose members are highly skilled in joint manipulation. The hon. secretary of the British Osteopathic Association tells us in the *Times* that his association has a register of fully trained osteopaths —"and I repeat *fully trained*," he says. But "fully trained" in what? If in manipulation only, and in experience only of those conditions which are benefited thereby, then the words are surely misleading. For how can students with this training alone distinguish between those cases which should never be submitted to manipulation and those which should? He is trained in one branch only of physical medicine, whereas the chartered masseur or masseuse is trained in several branches, and many of them in joint manipulation. If the claim is made that we have in osteopathy a panacea for all ills, this must manifestly be a pernicious and dangerous doctrine.

The chartered masseurs and masseuses sign an undertaking only to work under the instructions of a medical practitioner, because it is realised that, not being trained in general diagnosis, they would, if they claimed to make the diagnosis (which is the one essential preliminary to all intelligent treatment), degrade themselves to the level of the quack and the charlatan. When, however, their aid is sought, it should be as experts in their own line of treatment. So too with the osteopath, the chiropractor, the bone-setter, and members of other cults. So long as they refuse the general training that is essential to general diagnosis, their treatment can only be empirical, their teaching inadequate, and their doctrine therefore dangerous.

Physical treatment has come to stay. Twenty-five years ago there were some seven hundred English masseuses on the register of the Chartered Society. It now records over eight thousand names of men and women. This veritable army of fully trained, skilled, and competent professional men and women are loyal to our profession. None hate more than ourselves the interloper in the form of the "quack," yet many medical men are willing to employ an "outsider" when they prescribe physical treatment. For our own sakes and that of our patients let us extend to the chartered masseur and masseuse a loyalty not less than that which they extend to us.

Still medical practitioners of the older generation find it hard to recommend physical treatment. They know little or nothing about its possibilities. They are, however, learning very rapidly; and a scepticism which was almost universal twenty-five years ago is now almost invariably replaced by a desire for accurate guidance as to what is possible in physical treatment and what is not. Quite rightly they have refused to prescribe the (to them) unknown, and several writers in the correspondence in the *Times* have testified to the fact that failure on the part of medical men to prescribe manipulative treatment has caused them prolonged and unnecessary disability or suffering. On the other hand, it must not be forgotten that the caution which has proved disastrous for them has saved countless fellow-sufferers not only from disappointment, but often from an increase of suffering and possibly even from sheer disaster. It is pitiful to see day by day patient after patient who has suffered mentally, physically, and financially at the hands of those who have administered so-called "treatment," which any medical man of wide experience must have known would have been unavailing.

Here the osteopath replies with a tu-quoque. "Look," says he, "at the numbers of those who, having sought help unavailingly from ordinary medical or surgical sources, are driven at last to seek help from osteopathy, which alone is able to bring relief." There is truth in the accusation, because medical men as a whole have not as yet prescribed manipulative treatment as freely or as frequently as they would now be justified in doing. On the other hand, by this same caution, they have not fallen into the mistake of recommending it for that far greater number of their patients for whom it would be unavailing, harmful, or dangerous. If we consider the ordinary day's work of the general practitioner, who sees perhaps thirty cases a day, should we be wrong in estimating that those who are not suffering from some fatal disease will, with the exception of one or two, recover, or will be well on the road to recovery, in the course of a month, without the aid of manipulation? For those one or two manipulations might hasten recovery, or, as we have seen, be essential for it.

Manipulative treatment is, from its very nature, either essential, innocuous, or harmful; for a joint "lesion," as understood by the osteopath, may best be defined, in the words of one of them, as "the immobilisation of a joint in a position of normal movement." This, in simple language, is equivalent to saying that there has been a "seizing-up" or "locking" of a joint, so that normal mobility is impaired. If this be so, recovery can presumably only take place in one of three ways: by manipulation, by automatic relief of the "locking" (usually during profound sleep—and this does in fact occur at times owing to muscular relaxation), or as the result of an accident. If recovery takes place without one of these three agencies, no osteopathic "lesion" can have been present. Yet most people do recover from a variety of ailments, injuries, and diseases without any of these three aids to recovery, so that to describe osteopathy as a system of treatment in general must be an exaggeration, and the utmost that can be justifiably claimed is that manipulation has a place in the art of healing for cases specially selected from the general mass of those who suffer. It is the withholding of physical treatment in those cases that is one part of the tragedy; but an even greater part is the assurance when false, but so often given, that all will be well, provided the victim perseveres sufficiently with the "treatment."

If we are asked how it has come about that older practitioners amongst medical men still look askance at manipulation, we have to search for the cause. And surely the cause is to be found in the fact that among their patients they cannot but recall cases in which definite injury has been inflicted by injudicious treatment at the hands of those who claim to be able to perform "cures" by methods which, in the particular cases concerned, are contrary to the known laws to which reference has already been made, and who offer promises of cure where cure is impossible. Only those medical men who, from the nature of their work, encounter these cases daily, can realise the immense addition to human suffering caused in this way.

Still, there is little excuse, now that joint manipulation is a regular part of physical treatment, for patients like some of those who wrote in the columns

of the *Times* being unable to secure relief from the hands of many qualified medical practitioners; and the time is not far off when patients of this type will be referred automatically to the practitioners of physical medicine, or to their orthopædic surgical colleagues, just as patients suffering from other complaints are referred to practitioners in their own special branch of medical practice. The coming generation of medical practitioners will all know something of physical treatment; more and more medical men and women are becoming expert in prescription and practice. Already some instruction is compulsory in the ordinary medical curriculum. Then "osteopathy" will come into its own and proper place, not under its present name, but as a special branch of physical medicine known as "treatment by manipulation," which will also include what is good in that other method of treatment which has so long been known under that most inappropriate title—"bone-setting."—I am, Sir, yours faithfully,

Dec 30th, 1933. JAMES MENNELL.

ASCARIS IN THE APPENDIX

To the Editor of THE LANCET

SIR,—*Ascaris lumbricoides* as a cause of appendicitis is rare. I send you a photograph of an appendix I removed from an Egyptian man aged 20 who was suddenly taken with classical symptoms of acute appendicitis. I operated within two hours of the onset and removed the appendix. On putting it into spirit after the operation was over, so as to be able to give the trophy to the patient, imagine my surprise to see the end of an ascaris worm wriggling out! What intrigued me was the thought of the other end of the worm securely (I hope) tied into the stump of the appendix. I ligature and also bury the stump.

The appendix and the ascaris.

The Egyptian population of Port Said is heavily infected with ascaris, and this is, in my opinion, due to the number of pigs bred at the town destructor as I noted in your Journal (1925, ii., 523) in reference to an annotation on *Ascaris lumbricoides* in Hertfordshire. I am, Sir, yours faithfully,

Cairo, Egypt. H. E. S. STIVEN.

OCULAR CONDITIONS IN DIABETES

To the Editor of THE LANCET

SIR,—I must disagree with the opinion expressed in Dr. Wauchope's letter (THE LANCET, Dec. 30th, 1933, p. 1510) that the eye tension is not a good diagnostic guide between true diabetic coma and hypoglycæmic coma due to an overdose of insulin. My experience has led me to place great confidence in this sign. I have noticed a lowered eye tension, judged by ocular digital palpation, in most though not in every case of diabetic coma, and have never been able to be sure of it in hypoglycæmic conditions. It seems to me also that the accurately recorded measurements by the tenometer support the above view. Weichmann and Koch (quoted by Dr. Wauchope) found an average fall of tension of only 5 mm. during hypoglycæmia—which might be appreciable to the ophthalmologist's finger, but certainly not to mine. Again Gray (Brit. Jour. Ophth., 1933, xvii., 577) recently reports no fall but a slight rise of tension during overdoses of insulin, so that contradictory results have been found. On the other hand no one denies the obvious fall of tension in most cases of diabetic coma and this is such a clear help in diagnosis (I believe it to be pathognomonic) that it seems a pity that doubt has been thrown on it without, in my opinion, just cause.—I am, Sir, yours faithfully,

Harley-street, W., Dec. 29th, 1933. R. D. LAWRENCE.

THE CALDECOTT COMMUNITY

To the Editor of THE LANCET

SIR,—I read with great pleasure your leading article last week on the Caldecott Community, a boarding-school for normal children with abnormal home surroundings. There you suggest that medical men, who may be responsible for advice as to the care of children exposed to difficult or unsatisfactory home conditions, would be interested in visiting the Community in its home, The Mote, Maidstone, Kent. As a medical member of the council I warmly support your suggestion, and can assure any visitors of a most hearty welcome. To see the children at their work and play is convincing evidence of the great work this school is doing for this group of children for whom help is so much required.

Pigs feeding on rubbish beside the destructors at Port Said.

Unfortunately the financial resources of the Community are sadly inadequate to meet the demand, and there is always a considerable list of children waiting for admission. With additional funds the Community could handle many more children, and help is urgently needed to enable the Community to take more children of parents in really needy circumstances. A partial adoption scheme has now been inaugurated by means of which a subscriber can, if he desires, focus his support and interest on one particular child. The council believe that if the work of the Community were generally known this financial support would soon be available. They hope, therefore, that any of your readers who are interested will write for the annual report and, if possible, visit the Community.

The future of the children after they leave school, and their ability to accommodate themselves to unfortunate conditions after their life of unrestricted opportunity in the Community, are questions naturally raised in any discussion of the work. The answer is contained in last year's report, where it is noted that of 46 children who have passed through the school and gone into active life, two only are unemployed and unsatisfactory. Can any other school, given the best of material, show an equal record? I am, Sir, yours faithfully,

London Hospital, E., Jan. 2nd, 1934. ARTHUR ELLIS.

PANEL AND CONTRACT PRACTICE

SOME FINANCIAL PROBLEMS

THE beginning of a new year is always associated with financial problems, and headings such as "Doctor's Bills by Instalments" have been prominent in the lay press. There has, however, been no mention of the abolition of the 10 per cent. cut in the insurance medical service, a matter which has been under discussion by the Insurance Acts Committee as well as at the last panel conference, when a resolution was passed that the medical profession should coöperate as far as possible with other services whose remuneration is still subject to deduction, such as teachers, police, and defence services. We are told that the other services did not desire coöperation. There does not appear, therefore, to be much hope that the remuneration of insurance practitioners will be restored to the normal level for some time. The loss of income is affecting some practitioners very seriously, making just the difference of the kind of education a father can provide for his son.

The transference of many unemployed persons from the national health scheme to public assistance has led to the suggestion, now being acted upon in various parts of the country, that private practitioners should be prepared to accept poor-law cases as panel patients, replacing the whole- or part-time medical officers. This scheme is working in Newcastle-upon-Tyne and in Wiltshire. The moneys which would be paid to the district medical officers are pooled and from that pool the practitioner is paid pro rata for services rendered. The *Medical Officer* has stated certain objections to this scheme:—

(1) The participating practitioners cannot know what they are going to get per patient or per visit until the accounts are made up later.

(2) Since officers now serving are only to be replaced as they fall out the best posts will not soon become vacant, and the scheme is worst at the start.

(3) Poor-law pay was always inadequate. It may, however, be wise to submit to some present hardship in the hope of future improvement, for public assistance committees may be prepared to pay a little more to make the scheme work smoothly.

(4) The objection of practitioners to clerical work. Every publicly elected body must present a balance sheet for audit and requires statistical data.

The journal remarks that the public will not pay the private practitioners more than it pays its own immediate servants and for that payment it expects the same service. "It is useless to plead," it adds, "that private practitioners can give better service than salary paid officials." But it is fair to inquire what incentive a salaried officer has to go out of his way to do just that little extra which makes all the difference to the patient's well-being, that something which makes the private practitioner beloved by the people he attends. And the tendency will be for such work to be better done when shared amongst (say) ten doctors of choice than by one man officially appointed.

Contract service started in Lincolnshire at the end of 1932 for persons unable to pay ordinary medical charges receives the blessing of Dr. W. G. Booth, the county medical officer, who writes: ". . . . it is hoped that this scheme will lead to correction of defects found at medical inspection, which in the past have often been neglected by parents through fear of the expense involved. . . . A list of children having defects which can be dealt with by their own doctors will be sent to the practitioners concerned by the school or maternity and child welfare offices. The practitioners will then be able to follow up without fear of any motives of gain being imputed against him, and correct the defects of any child on his list as an association subscriber."

A large public meeting at Aldershot has brought to notice a scheme of contract service which is there working well. Payment of two guineas a year secures maintenance and nursing in a hospital or nursing home up to a maximum of £5 5*s*. per week for a period not exceeding four weeks; a contribution not exceeding 28 guineas towards the fees of consulting physicians, surgeons, and general practitioners in sole or part charge of the case; and a sum not exceeding £5 5*s*. towards the cost of special out-patient treatment or pathological examinations. There is an income limit for single persons of £325, and for married couples with more than one dependant of £750. It is left to the patient to choose his own medical attendant and to arrange with him what the charges are to be.

On Walking Out of the House

A fortnight ago in this column Dr. Norris raised the interesting question how far the action of a third party can affect the contractual relationship between a doctor and the insurance committee. The legal position is that by accepting (not necessarily signing) the medical card of an insured person A., Dr. B. thereby undertakes to carry out what may be roughly described as general practitioner attendance on A., if his condition at any time requires it, in virtue of his existing contract with the insurance committee to do so. There is no provision in the regulations to allow him to break this contract by giving up A.'s treatment if (say) relatives interfere in the attendance. If his position becomes so unfortunate that he thinks it advisable to retire from the case personally, he can do so, but he cannot leave the case without attention. It is his duty to provide a deputy if he cannot persuade A. to change to another doctor voluntarily. This line of conduct is not at all uncommon in insurance practice; the treatment of a miscarriage, for example, comes within the terms of service, and yet many doctors always arrange to hand over such work, paying a colleague to do it for them. The patient cannot complain, for although the contract is to attend the patient personally, in special cases the attendance may be carried out by a deputy. It would obviously be very difficult for the doctor to prove in court that the action of the relatives of a patient had made it necessary for him to neglect any case that he was under contract to attend by retiring from it without providing for any medical attention; for it could be said that he might have sent a deputy to do the work if he did not feel inclined to do it himself. If the relatives behaved in such a way that the deputy too could not carry on with any honour to his position, or if they refused the services of the deputy the grounds of complaint would be gone. Dr. B. would not therefore be punished and consequently he would not have any action at common law against the relatives as suggested by Dr. Norris.

The position is not quite so simple for those in unopposed country practices where no deputy is available. The doctor's only safe procedure is to report the matter to the insurance committee and carry on with the treatment. The fact that a report has been made will impress the relatives, who will not relish an official letter about their conduct. This is likely to

relieve the situation. It should be remembered, however, that the proceedings of the medical service subcommittee are not open to the public. Names are not even published to members of the insurance committee; only those members who actually hear the case know the names of the parties thereto. The report always speaks of a patient A. as complaining against Dr. B. If, however, Dr. B., on his side, can prove that the patient A. is spreading reports amongst his patients, such as that he has been sentenced and fined by the insurance committee for neglecting the patient A., obviously with the intention of doing Dr. B. some harm, then without doubt Dr. B. will have grounds of action against A., and he would probably obtain damages in a court of law. Such statements are, however, very difficult to trace or to obtain in writing. This vindictive type of person is usually not of sufficient substance to make it worth while to arouse all the storm again—this time with the local press giving all the names—on the chance of obtaining damages which could hardly be substantial. Undoubtedly the wisest plan is for the practitioner to give timely notice to the committee to have the name removed from his list of insured persons, without giving any reason. Troublesome patients do not like being told to go to some other doctor. The new doctor will probably inquire why they left the other one and will probably ask them awkward questions. This spreads round the practice until it becomes generally known that the practitioner is the type of man who will not put up with rudeness or other nonsense. Patients then take more notice of what is ordered or required, and the effect is good all round.

THE DOCTOR'S DAY

"Come, tell me how you live," I cried,
"And what it is you do!"

XXVII.—ON A POLAR EXPEDITION

FRANKLY there is no average day in the life of a surgeon to a Polar expedition, but I can tell you some of the things he does. What he does not do is to spend his time walking about in a uniform with brass buttons and red braid. It is customary for his ship to be registered as a yacht and for the personnel to wear a double-breasted blue suit and yachting cap, but only when entering or leaving port. Every member of the staff has to be prepared to undertake the general work of an explorer as well as his own special duties.

PREPARATION

Before the ship leaves England he has to spend much time at the offices of the expedition where all the members foregather to interchange views and there are constant visitors: representatives of firms supplying equipment, ships' stores, provisions, clothing, sledging gear and transport; pressmen seeking information; scientists from the Royal Geographical Society; individuals without the least qualification asking to be taken on, or members of the public wanting permits to visit the ship. The surgeon is beset by the manufacturers of preserved and potted meats, tinned and dried fruits, cereals, dried and condensed milk, all urging the food value and vitamin content of their particular brand; by representatives of instrument makers and drug houses specialising in compressed tablets and dressings. Quite a number of doctors drop in for a chat. Equipment has to be considered from all aspects, for anything omitted at this stage cannot be replaced when the expedition has left civilisation. A detailed list of requirements has to be worked out, quantities calculated, and an effort made to secure the maximum value in the smallest possible bulk. Drugs are taken wherever possible in tablet form, instruments and appliances which will not fail to function when actually required. It is well to remember that neat compact outfits suitable for warm climates may be useless when fingers are benumbed with cold. When the lists are complete, and have been carefully checked, the surgeon must visit all the firms to ensure that everything is supplied exactly to order. He must see and inspect every single article before it is packed. He must consider how best to combat scurvy, frostbite, snow-blindness, and other troubles of polar travellers, coöperating with his colleagues in charge of food and clothing. He must consider and prepare for sanitary arrangements. There may, too, be members of the staff requiring physical examination. Finally he is responsible for loading and stowing away his equipment on board; he must know exactly where in the hold every case has been placed. He will probably have allotted to him other special duties besides the maintenance of health and care of sick. If sufficiently qualified he may be asked to take part in the biological or meteorological work. Almost certainly he will have the care of the sledge dogs and must prepare accordingly.

THE VOYAGE

On board ship the surgeon becomes an ordinary seaman. He no longer works by day and sleeps by night, but must like all others on board stand his watch, four hours on and four hours off, or if the numbers permit of three watches, four hours on and eight hours off—but in this case he will have to turn to at stated hours for certain duties irrespective of which watch it may be. An average ship's day is divided as follows:—

6.0–8.0 A.M. ..	Wash down decks.
8.0 A.M.	Breakfast.
8 A.M.–12 noon ..	Morning watch.
12 noon–4 P.M. ..	Afternoon watch.
12.30 P.M.	Dinner.
4.0 P.M.–6.0 P.M. ..	Dog-watches divided to allow for the routine changing round of the times of standing the watches.
6.0 P.M.–8.0 P.M. ..	
6.30 P.M.	Supper.
8.0 P.M.–12 midnight	Evening watch.
12 midnight–4.0 A.M.	Middle watch.

During the "watch on deck" the surgeon will have to carry out the ordinary work of the ship, to take a trick at the wheel for two hours at a time, to go aloft to take in or loosen sail, to help with stowage of cargo, to paint, or indeed to do all or any of the odds and ends of daily life aboard. In the "watch below," when he is off duty, he attends to his medical and surgical cases; after this he may sleep, read, write his diary, mend or wash clothes. Most of the ship's work is done between 6.0 A.M. and 8.0 P.M.; those on watch between 8.0 P.M. and 6.0 A.M. do only what is essential for navigation: steering, keeping look-out, or setting sail. The night watches, except in bad weather, are pleasant restful periods; they are the times for the long deep thoughts or the intimate talks one does not get ashore. At the ports en route the surgeon interviews the port doctor, who has to be satisfied that all is well before the yellow quarantine flag is pulled down. Before this no one but a pilot may board the ship.

Of sickness there is little, as all the members of the staff must have a clean medical sheet before joining. Some constipation or, in the case of firemen who drink too much water in the stokehold, diarrhœa. Sea-sickness is never treated. It is considered no disgrace to be sea-sick, but it is a point of honour not to go off duty or lie down to it. Accidents, trivial or serious, may occur at any time; the surgeon must do all his own nursing, which calls at times for considerable adaptability and ingenuity.

THE BASE CAMP

Arrived at the scene of operations in the ice area, the surgeon will be primarily responsible for seeing

his own equipment safely unloaded from the ship. A base will have a wooden hut as living quarters, and the surgeon must adapt his own small quarters to make a dispensary. Only when an operation of any sort becomes necessary can he spread himself and commandeer the whole accommodation, when he can rely on the willing assistance of everybody according to their ability. In the ordinary way purely medical or surgical work will not likely occupy more than half an hour daily, but the dogs may take as much as an hour—getting rid of parasites or repair of fighting wounds. If food is scarce the feeding of the dogs and cooking their rations will require thought and care; each dog is weighed once a week, the puppies twice, to see that the ration is adequate. If the surgeon is also a dog driver with a team of his own, much of the day's work at this stage will consist in training and exercising the team, conveying sledge loads here and there, making journeys for scientific purposes or in search of seal and penguin for food. As an anatomist he will be called upon to dismember the carcasses of any game which has been brought in; pride compels him to do this neatly and well.

On certain days the surgeon takes a turn at the so-called "menial" work of the hut—assisting the cook, cleaning dishes, scrubbing tables and floor, &c. Watches are no longer kept as on board ship, but in rotation he must stand his night watch, keeping a general look-out, taking routine meteorological observations, quelling dog-fights or catching dogs that have broken loose, refuelling the stove, and other duties inside and outside the hut. The winter night of polar regions is a difficult and trying time, spent largely in preparing for the long sledge journeys which commence with returning daylight. The surgeon must give thought to the sledging ration, especially with regard to its vitamin content, and select a light and compact medical equipment.

SLEDGING

On a sledge journey the morning ration is cooked and eaten before the individual members get out of their sleeping-bags. The party then gets up, the tent is taken down, and the sledge loads packed. Toilet consists merely of putting on overalls, helmet, footgear, and mitts. Modern explorers clean their teeth—no other ablutions are performed. The daily functions are performed at this stage, or deferred till the body has warmed up. The dogs are hitched to the traces and with a final look round to see that nothing is left, the day's journey begins. Occasional halts are made to rest men and dogs, to take observations, collect specimens, or to eat the midday ration. The distance covered varies with the weather and the surface conditions. On making camp, the first thing is to unhitch, tether, and feed the dogs, the tent is set up and while the cook of the day prepares the evening meal, observations are taken and the position checked. When each man is in his sleeping-bag, the evening ration is whacked out with scrupulous exactitude. Records are entered, diaries written up and—so to sleep.

With careful preparation there is likely to be little medical or even veterinary work. Frostbites and snow-blindness may require prompt first aid, and the onset of scurvy must be watched for. Its appearance may curtail the projected work and necessitate forced marches to save life. Emergencies may modify the course of an expedition and the surgeon's work. The most serious is the loss of the ship, when the party may find itself cut off from supplies and forced to winter on a wholly inadequate ration; to spend months adrift on an ice-floe, or to make a long and uncomfortable boat journey. Constipation, sea-water boils, chafes and blisters, cuts and sprains, frostbites and snow-blindness are minor disabilities which then become of the greatest importance. Frostbite, easily cured at the time of onset, may if unrecognised or inadequately treated develop into gangrene, requiring amputation under anæsthesia. The surgeon himself is as liable to suffer in these adverse circumstances as any other member of the team. His help may be required when—wet, hungry, tired, with fingers numb from cold and painful from frostbite, and temper frayed to rags—he is feeling his worst. Such conditions call for the best in a man.

It is obvious that these cursory notes could have been expanded in many directions, but the design has been to give a general view of the responsibilities of the doctor to the expeditionary party.

NEW YEAR HONOURS

THE list of honours issued on Jan. 1st contains the names of the following members of the medical profession:—

K.C.V.O.

Sir William Tindall Lister, K.C.M.G., F.R.C.S.
Consulting ophthalmic surgeon to the London Hospital, surgeon oculist to H.M. Household.

Knights Bachelor

Behari Lal Dhingra, C.I.E., M.D.
Chief Minister, Jind State, Punjab States.

Frederic Rowland Mallett, M.D.
Consulting surgeon to Bolton Infirmary.

Robert Muir, M.D., D.C.L., F.R.S.
Professor of pathology in Glasgow University.

C.B. (Military)

Major-General Henry Charles Rupert Hime, D.S.O., M.B.
Deputy-director of medical services, Southern Command, hon. physician to the King.

C.M.G.

Major John Gilmour, M.C., F.R.C.S. Edin.
President of International Quarantine Board, Alexandria.

Arthur Robartes Wellington, M.R.C.S.
Director of medical and sanitary services, Hong-Kong.

C.I.E.

Lieut-Colonel Ram Nath Chopra, M.D., I.M.S.
Professor of pharmacology at the School of Tropical Medicine, Calcutta.

Lieut.-Colonel Alexander Dron Stewart, M.B., I.M.S.
Director of All-India Institute of Hygiene, Calcutta.

C.B.E.

Miss Maud Mary Chadburn, M.D., B.S.
Senior surgeon to the South London Hospital for Women, chairman of the cancer committee Marie Curie Hospital.

Miss Helen MacMurchy, M.D.
Lately chief of the division of child welfare, Department of National Health, Canada.

Frank Edred Whitehead, M.R.C.S.
Lately director of medical and sanitary services, Nyasaland.

O.B.E.

Thomas Hunter Massey, M.C., L.R.C.P.
Senior medical officer, Kenya.

Robert Owen Morris, M.D., F.R.S. Edin.
Lately director of education, Welsh National Memorial Association.

Barugh Spearman, M.B.
Deputy-director of sanitary services, Zanzibar.

Peter Donald Strachan, M.D.
Superintendent of the leper settlement, Botsabelo, Basutoland.

O.B.E. (Military)

Surgeon-Commander Kenneth Hill Hole, M.B., R.N.

Kaisar-i-Hind Medal

Sorabji Pestonji Shroff, F.R.C.S. Edin.
Eye specialist, Delhi.

OBITUARY

SIR MONTAGU COTTERILL

LATE PRESIDENT, ROYAL COLLEGE OF SURGEONS OF EDINBURGH

We regret to announce the death of Sir Montagu Cotterill, consulting surgeon to the Royal Infirmary Edinburgh, which occurred at his residence in Edinburgh on Saturday, Dec. 30th, in his eighty-third year.

Joseph Montagu Cotterill was the son of Dr. Henry Cotterill, bishop of Grahamstown, S. Africa, and later bishop of Edinburgh. He received his early education in Grahamstown, whence he came to Brighton College, where he displayed as a boy his wonderful aptitude for all ball games. He proceeded to Edinburgh University where he graduated M.B., C.M. in 1875 with the University prizes in surgery and pathology. He held the house appointments in the Royal Infirmary, took the F.R.C.S. Edin. in 1879, and in 1883 was appointed assistant surgeon to the Infirmary. His professional career was from this time bound up with the institution he served so well, and with the College. He was appointed full surgeon to the Infirmary in 1897, and lecturer on surgery in the Edinburgh school of medicine; while at the College he was for a long period an examiner in surgery. He acted at the same time as medical officer to Fettes School, and made some useful contributions upon abdominal and cerebral surgery to medical literature.

SIR MONTAGU COTTERILL

Photograph by Drummond Young

The war found Cotterill over 60 years of age, and he saw no direct service abroad, but he acted throughout the period, with the rank of Lieut.-Colonel, R.A.M.C., as chief surgeon to the Craigleith Military Hospital, and in recognition of his valuable work in that connexion he was appointed C.M.G. in 1917, and in 1919 was knighted. In the interim he had been President of the Royal College of Surgeons of Edinburgh. On his retirement from active service in the wards he was made consulting surgeon to the Infirmary.

Apart from his distinction as a surgeon, Sir Montagu Cotterill was well known as a sportsman. As a boy at Brighton he became a first-class cricketer and played for Sussex. He represented the county for several years, two or three time heading the batting averages, and was selected, once at least, for the Gentlemen *v.* Players. He kept up both cricket and football as a young man in Edinburgh, and later became a fine shot and fisherman.

Sir Montagu Cotterill married in 1879 Mary, daughter of the late Archdeacon Wynne Jones, by whom he had a son and three daughters. Lady Cotterill died in 1909.

ALEXANDER PAINE, M.D. Lond., D.P.H.

LATE DIRECTOR, CANCER HOSPITAL RESEARCH INSTITUTE

Dr. Alexander Paine, whose death at the age of 67 occurred on Dec. 21st, will be little but a name to the younger generation of pathologists, for he retired from active work shortly after the end of the war, but in his time he occupied a leading position in the London pathological world. He was educated at Blundell's School and St. Mary's Hospital, and after qualifying spent a couple of years in general practice. His bent, however, was towards the laboratory, and he soon forsook practice and returned to St. Mary's, where he worked under H. G. Plimmer, then pathologist to the hospital. When Plimmer left the hospital to devote himself to cancer research Paine followed him, and later was attached to the Cancer Hospital, eventually becoming director of the research department there.

Paine belonged to the days when men largely taught themselves pathology and bacteriology, and it is difficult for those of us who are accustomed to the workings of a modern laboratory to appreciate the difficulties with which he and many of his contemporaries had to cope. Of those difficulties Paine had his fill, and only a strong natural bent for laboratory work and fine perseverance enabled him to take his place among those who worked under more fortunate circumstances. Although the later years of his working life were devoted to cancer research he was fundamentally interested in bacteriology, and he will be remembered as the joint author with Dr. F. J. Poynton of a long series of papers on rheumatism. This work was the outcome of Poynton's interest in the study of rheumatic heart disease and his suspicion of its infective origin. He obtained the coöperation of Paine, and for 16 years they worked on the subject without any team of assistants and assiduously. Paine showed himself an original and resourceful investigator with the true research mind, which, while realising the essential points, makes itself also a master of detail. His bacteriological methods were followed by almost every researcher who has been able to claim positive results; Wassermann and Triboulet, who had published their views while Poynton and Paine were engaged upon the task, exchanged cultures with their English colleagues in proof of their similarity. Although the diplococcus isolated by Poynton and Paine has not been confirmed by many, the considerable support which the authors received on its enunciation may be gaining in strength, for in recent years the pendulum appears to be swinging back in favour of the streptococcal origin of rheumatic heart disease, chorea, and arthritis.

It cannot be said that Paine made any great addition to the knowledge of cancer, though those who were among his intimates appreciated his wide grasp of the subject and the ability with which he approached any new theory or technique which was brought forward. His general conclusion was that cancer is a peculiar reaction to various types of irritation, infective or otherwise, and not a specific disease. The organisation of the research department at the Cancer Hospital and the planning of the original Research Institute emanated from his knowledge and enthusiasm, and his conceptions of the future trend of cancer research have been much justified. It was an undoubted misfortune to all concerned that Paine and some of his colleagues at the Cancer Hospital did not see eye to eye in certain matters, for so long as he and the members of his staff formed a congenial

circle the promise for the future was good. But during the war years cancer research was necessarily largely in abeyance, and Paine felt this situation acutely. He had a severe nervous breakdown, and on the termination of his appointment retired to the country, and cut himself completely adrift from his old life and associates.

Paine was a man of strong personality, with a highly original mind and pronounced views on many subjects. He was not a scholar in the ordinary sense—he learnt from men rather than from books; but he was well informed on a wide range of subjects. Above all, he was a born experimentalist, and a paper published shortly before the war on the production of acute appendicitis in rabbits illustrates well the clarity and precision of his outlook. He had not many friends, and was of a retiring disposition, but his whimsical humour and wealth of anecdote made him an admirable companion when he liked. Those who knew him well had a real affection and respect for him, for his was a loyal and generous character.

He married late in life and leaves a widow and a boy seven years of age.

ALFRED OWEN LANKESTER, M.R.C.S. Eng.

WE regret to announce the death of Dr. Owen Lankester which occurred on Dec. 23rd at his house in Upper Wimpole-street quite unexpectedly. He was the youngest son of the late Dr. Edwin Lankester, F.R.S., who succeeded Thomas Wakley as coroner for central Middlesex, by his wife Phebe, the sister of Samuel Pope, the famous Parliamentary counsel. His elder brothers were Mr. Forbes Lankester, the police magistrate, and the late Sir Ray Lankester.

Owen Lankester was educated at St. Paul's School, and proceeded for his medical training to St. Bartholomew's Hospital, where he qualified as M.R.C.S. in 1884, at which time the separate diplomas of the Royal Colleges constituted complete qualification. Although he made no attempt at academic distinction he was a successful student, was house surgeon to the hospital, and proceeded to take other house appointments at the City of London Hospital, and the East London Hospital for Children, now the Princess Elizabeth of York Hospital. Here the foundation was laid of his ever abiding interest in pædiatrics. He was for a time in general practice in the north of London, when he became surgeon to the St. Monica Home for Sick Children, Kilburn. He then returned to live with his mother and sisters in Upper Wimpole-street, and soon obtained a large practice in Marylebone. He owed much to his sympathetic and attractive personality, but his success in practice derived its real strength from his clinical acumen and from the resourcefulness gained from much hospital experience. He was associated with numerous charitable institutions, acted as honorary medical officer to the Maurice Girls' Home, and as physician to the East London Nursing Association. His also was a particularly valuable voice in the management of Epsom College, on the directing council of which he sat for many years, proving both a regular attendant and a shrewd adviser on any question of management, of personnel, or of charitable action which might arise. Dr. Owen Lankester will be missed by an extensive circle of patients, colleagues, and personal friends.

OWEN LANKESTER

Mr. Ivor Back writes:—

"The death of Owen Lankester has deprived London of a very real character and a very lovable personality. He qualified almost exactly 50 years ago, though it is difficult to realise it, and he was one of the last of the Victorian family-physicians who remained in active practice. His most ardent admirer would not claim for him that he was endowed with the brains of his brother, Ray, but he had a genuine healing instinct based on a profound common sense. During his 50 years of practice he kept himself alive to the advances of medicine and surgery, but he never allowed himself to be stampeded into employing a new form of therapy until he had convinced himself that its efficacy had been proved. And his bluff and kindly self helped his patients immensely. Stevenson might have been thinking of him when he wrote 'generosity he had and tact tried in a thousand embarrassments; and, what are more important, Herculean cheerfulness and courage.' I venture to write these few lines because I had many points of contact with him. I worked for him from time to time, I was once his patient when I had influenza, and he was once mine when he had a bad accident in a taxi; but most intimately I knew him in the Savile Club. Being a bachelor the club was to him a home from home, and he was there held in an affectionate regard given to few, both by the members and by the staff. At dinner he always sat at the end of the long table in the coffee-room, and his presence was a guarantee that all of us who had the luck to sit in his immediate neighbourhood were sure of a pleasant evening. His laugh was the most infectious I have ever heard, and it came from a heart which radiated a kindliness and a tolerance and a love for his fellow men, which were as genuine as they are rare."

CLEMENT BRYCE GUNN, M.D. Edin.

BY the death on Christmas Day of Dr. Clement Bryce Gunn the Scottish Border loses an interesting personality. Born in Edinburgh in 1860—his father was a member of the staff of the *Edinburgh Evening Courant*, a paper long ago extinct—Gunn graduated M.B., C.M. at the University in 1882, and proceeded to the M.D. in 1885. He was all his life a general practitioner, and filled, in turn, the usual local offices that fall to the senior practitioner of an active and well-populated area like Peebles. He was medical officer of the parish and of the poor-house, local factory surgeon, local medical officer of the Scottish Education Department, and workmen's referee; and he conducted a large private practice, where he never spared himself. He showed the intelligent sympathy of a good practitioner, and the insight of a wide clinical experience. His happy temperament and desire to serve the public interests were affectionately recognised. And in addition he found time to express the literary faculty and facility which may be said to have been with him in the cradle, as the son of a journalist. He produced some 14 volumes

on "The Books of the Churches of Peeblesshire," and everyone familiar with this class of work knows that such compilations involve persistent industry and patient investigation. An even more interesting historical series from his pen is "Books of Remembrance of the Town and County of Peeblesshire," which includes photographs and epitaphs of all the Peeblesshire men who fell in the war. Gunn took a great part in reviving the midsummer festival of Beltane, and more recently was known as the Warden of Neidpath, a picturesque old castle commanding the Peebles valley.

Dr. Gunn is survived by his widow, a widowed sister, two sons, and two daughters, one of whom, Miss Winifred Gunn, made a good impression with a Scott centenary play.

HENRY GRATTAN NELSON, M.D. Edin.

THE death is announced, occurring on Christmas Eve, of Mr. Nelson, surgeon to the Royal South Hants and Southampton Hospital. He was born in 1887 at Keynton, Adelaide, South Australia, the third son of the Rev. J. Nelson, and his boyhood was spent in Australia and in India. At the age of 17 he began his medical studies at Edinburgh University and after a successful career as a student graduated M.B., Ch.B. in 1910, proceeding to the M.D., which he obtained with honours in 1913. His first appointment was as a resident officer at Earlswood Asylum, Redhill, but in 1911 he became house physician at the Royal South Hants and Southampton Hospital. He followed this appointment with the house surgeoncy, which he was holding at the outbreak of war. He went on active service immediately with the R.A.M.C. and was employed as surgical specialist throughout the war, remaining as surgical referee and orthopædic specialist for some time under the Ministry of Pensions. On demobilisation he returned to Southampton and was soon afterwards elected to the honorary staff of the Royal South Hants and Southampton Hospital and became also surgeon to the Southampton Children's Hospital, visiting surgeon (under the 1929 Act) to the Borough Hospital, and consulting surgeon to the Fenwick and Hythe Cottage Hospitals. During recent years he built up a large consulting practice in the whole district and when he died of pneumonia, aged only 46, his surgical services were in wide demand. He was at the time of his death president of the Southampton Medical Society, for which institution as honorary secretary he had for long been an enthusiastic worker.

HENRY GRATTAN NELSON

[Photograph by Chandler

The following appreciation from a group of his colleagues has reached us:—

"A recital of the appointments held by Nelson serves to show that he was a hard worker and a successful surgeon, but beyond this does not tell what manner of man he was. A keen student of surgery and at the same time a critical one, he was receptive of new ideas, new technique, new advances, not only in the realm of his own craft but in the services ancillary to it. As a surgeon he was skilful, courageous but not without temerity, and gentle. His attitude in dealing with a patient engendered confidence and he was held in affectionate regard by those he was called upon to treat. As a colleague it was a pleasure to work with him, either at the bedside over a clinical problem, or in the committee room, where his opinion was much valued. He was very shy, perhaps too shy, of showing cases at clinical meetings but was always willing to demonstrate a method or a case to an individual doctor. Of recent years he has been especially interested in the new methods of examination and treatment of surgical diseases of the kidney and bladder; in fascial graft operations for hernia; in newer methods of anæsthesia; in thyroid surgery; in a series of cases of abdomino-perineal excision, and in acquiring specimens, photographs, and material generally for a book which he intended to write. A lover of home life, it was a delight to meet him in his family. He is survived by Mrs. Nelson and his four children, for whom the deep sympathy of the whole district is felt."

WAHAB McMURRAY, M.D. R.U.I.

THE death is announced in the Irish journals of Dr. Wahab McMurray, one of the first exponents of radiology in Australia. Dr. McMurray received his medical education at Belfast, and graduated as M.D., M.Ch. R.U.I. in 1881. He almost immediately migrated to Australia and practised for some time in Sydney. Shortly after Roentgen's discovery, and while specialising in dermatology, he was attracted by the therapeutic possibilities of the X rays, and was soon to suffer disastrous personal results, for at that time measures of protection had received no attention. Under exposure to the rays McMurray contracted severe burns from which he lost several fingers, but he remained a practising radiologist, undeterred by risk and suffering, until some three years ago, when his sight was affected so that finally he became completely blind. He was consultant dermatologist to the Sydney and Coast Hospital, and a Reuter's message states that a ward in that hospital will bear his name as a perpetual memorial to his heroism. He was the author of Anetodermia Erythematosus, published in the *British Journal of Dermatology* in 1921, and of a joint paper with Dr. E. S. Stokes, on Phagedenic Ulcer of Warm Climates, which appeared in the *Australian Medical Gazette*.

AHMED FAHMY, M.D. Edin.

THE death occurred in his house in north London on Dec. 18th of Dr. Ahmed Fahmy, who did so much admirable work under the London Missionary Society. He was an Egyptian who embraced the Christian religion when a youth, a procedure which compelled him to leave his native country. By powerful patronage he was able to enter the University of Edinburgh in 1878, being then 18 years of age. He graduated here in Arts, obtained the M.B., C.M. Edin. in 1886, and in the following year started on mission work at Amoy. That work continued at Changchow-fu for 35 years, during which time he trained many Chinese students as well as conducted a large practice of an international character. In 1899, during a period of extended leave, he proceeded to the M.D. Edin., and returned to Amoy, where he remained until 1920, when he retired from medical practice. Dr. Fahmy was twice married—first to

Miss Mary Chalmers, of Edinburgh, who accompanied him to China and died in 1902 of cholera, and secondly to Miss Duryee, an American missionary, who survives him.

MEDICAL NEWS

University of London

At recent examinations the following candidates were successful:—

M.S.

Branch I. (Surgery).—W. J. Ferguson (university medal), Guy's Hosp.; Wylie McKissock, St. George's Hosp.; P. V. Reading, Guy's Hosp.; and F. W. Willway, King's Coll. Hosp.

Society of Apothecaries of London

At recent examinations the following were successful:—

Surgery.—J. H. Bentley, Middlesex Hosp.; T. Gardner, Univ. of Leeds; N. C. Lendon, Univ. of Cambridge and St. Mary's Hosp.; J. Lipschitz, Westminster Hosp.; B. C. M. Palmer, Univ. of Cambridge and Guy's Hosp.; and D. A. Smith, Univ. of Cambridge and St. Mary's Hosp.

Medicine.—A. H. L. Baker, Univ. of Oxford and St. Mary's Hosp.; S. A. De Souza, St. Mary's Hosp.; J. P. Fitzgerald, Guy's Hosp.; J. C. Harvey, St. George's Hosp.; G. F. Metcalf, Univ. of Leeds; and S. G. Nathan, Charing Cross Hosp.

Forensic Medicine.—W. H. Bayley, St. Thomas's Hosp.; H. L. Canaval, Univ. of Vienna and Univ. of Bristol; E. C. Dax, St. Mary's Hosp.; J. C. Harvey, St. George's Hosp.; A. J. McGuire, Charing Cross Hosp.; G. F. Metcalf, Univ. of Leeds; E. N. Morgan, Royal College of Surgeons, Ireland; S. E. Roberts, Guy's Hosp.; H. D. Robinson, Guy's Hosp.; J. S. Scott, Univ. of Manchester; and J. E. G. Wright, Westminster Hosp.

Midwifery.—H. L. Canaval, Univ. of Vienna and Univ. of Bristol; S. Grodd, St. Mary's Hosp.; B. C. M. Palmer, Univ. of Cambridge and Guy's Hosp.; and J. S. Scott, Univ. of Manchester.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery, and midwifery: H. L. Canaval, J. P. Fitzgerald, N. C. Lendon, S. G. Nathan, and D. A. Smith.

International Union of Midwives

The sixth congress of this union will be held from May 25th to 29th, at the Midwives' Institute, 57, Lower Belgrave-street, London, S.W.1. The subject will be the Training and Education of Midwives. Further information may be had from the secretary of the congress, at the institute.

Appointments

HAINE, J. E., M.B., Ch.B. Edin., D.P.H., has been appointed Medical Officer for Guildford rural, Hambledon rural, and Haslemere urban districts.

JORY, NORMAN A., F.R.C.S. Eng., Hon. Surgeon to the Ear Nose and Throat Department, Bolingbroke Hospital.

Births, Marriages, and Deaths

BIRTHS

LODGE.—On Dec. 21st, 1933, at London-road, Leicester, Kathleen Lodge, M.B., B.S. (née Lankester), wife of R. Lodge, F.R.C.S., of a son.

MORRISON.—On Dec. 23rd, 1933, at East Green, Kilmacolm, Scotland, the wife of Dr. R. R. Morrison, of a daughter.

OKELL.—On Dec. 25th, 1933, at Winsford, Cheshire, the wife of Dr. Robert Okell, of a daughter.

WITTS.—On Dec. 29th, 1933, at 20, Devonshire-place, W.1, to Nancy (née Salzman), wife of Dr. L. J. Witts—a daughter.

MARRIAGES

TROWELL—HALL.—On Jan. 1st, at St. Michael's Church, Sutton Coldfield, Oswald Arthur Trowell, M.A., M.B., B.Chir., to Eveline Cecilia, only daughter of Mr. and Mrs. F.C. Hall, of Sutton Coldfield, Warwickshire.

DEATHS

BEADON.—On Dec. 22nd, at her home, Ballintemple House, Blackrock, Cork, I.F.S., Mary O'Brien Beadon, M.B., B.S. Lond., late Principal of the Lady Hardinge Medical College and Hospital, New Delhi, aged 53 years.—R.I.P.

GUILLEMARD.—On Dec. 23rd, 1933, at Old Mill House, Trumpington, Dr. F. H. H. Guillemard, aged 81.

HANDSON.—On Christmas, 1933, at Farnaby-road, Bromley, Kent, C. P. Handson, M.D. Camb., B.Ch., M.A., lat of New Cross.

LALOR.—On Dec. 24th, 1933, Lt.-Col. Nicholas Purcell O'Gorman Lalor, I.M.S. (retd.).

MCMEEKIN.—On Dec. 27th, 1933, at Torrington, Tunbridge Wells, Jane, widow of James McMeekin, M.D., of Belfast.

MASTERMAN-WOOD.—On Dec. 28th, 1933, at Torquay, Devon, Dr. James Ley Masterman-Wood, aged 49.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, Jan. 9th.—5 P.M., THERAPEUTICS AND PHARMACOLOGY. Short Papers. Dr. J. W. Trevan: Idiosyncrasies to Drugs. Dr. L. J. Witts: Therapeutic Action of Injectio Ferri B.P. Sir William Willcox: The Toxic Effects of Substances of Carbon Tetrachloride Type. 8.30 P.M., PSYCHIATRY. Dr. W. Norwood East: The Medical Aspects of Crime. 8.30 P.M., SURGERY. Discussion on Presidential Address, Strategy in the Fight Against Cancer: to be opened by Prof. G. E. Gask, Lord Moynihan, Sir Cuthbert Wallace, and Mr. J. P. Lockhart-Mummery. Other speakers will take part.

THURSDAY.—8.15 P.M., TROPICAL DISEASES AND PARASITOLOGY. Discussion on Some Aspects of Intestinal Diseases of European Children in the Tropics: to be opened by Dr. P. Manson-Bahr. Members of the Section of Disease in Children are specially invited to attend and take part in the discussion.

FRIDAY.—8.30 P.M., OPHTHALMOLOGY. Mr. Eugene Wolff: The Spread of the Iron Compound in Siderosis Bulbi. Mr. Arnold Sorsby: Three Groups of Unusual Fundus Disturbances. Cases: Mr. Arnold Sorsby: (1) Familial "macular coloboma" associated with Skeletal Defects; (2) Familial Central and Para-central Tapeto-retinal Degeneration; (3) Cavernous Atrophy of Disc in Retinal Arterio-sclerosis.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, W.

MONDAY, Jan. 8th.—8 P.M., Pathological Evening.

HARVEIAN SOCIETY OF LONDON, 11, Chandos-street, W.

THURSDAY, Jan. 11th.—8.30 P.M., Lt.-Col. E. L. Gowland: The After-treatment of Paraplegia following Spinal Injuries and of Disseminated Sclerosis. (Presidential Address.)

NORTH LONDON MEDICAL AND CHIRURGICAL SOCIETY, Royal Northern Hospital, Holloway-road, N.

THURSDAY, Jan. 11th.—9 P.M., Dr. M. Donaldson: The Latest Communiqué from the Cancer Front.

LONDON JEWISH HOSPITAL MEDICAL SOCIETY, Stepney Green, E.

THURSDAY, Jan. 11th.—3 P.M., Dr. T. Cotton and Dr. D. E. Bedford: Acute Affections of the Heart. (Symposium.)

SOCIETY FOR THE STUDY OF INEBRIETY.

TUESDAY, Jan. 9th.—4 P.M. (at 11, Chandos-street, Cavendish-square), Sir William Willcox: Medico-Legal Aspects of Alcohol and Drug Addiction.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

UNIVERSITY OF LONDON.

TUESDAY, Jan. 9th, and following WEDNESDAY and THURSDAY.—5.30 P.M. (at St. Bartholomew's Hospital, E.C.), Prof. J. R. Learmonth: The Surgery of the Nervous System with Reference to the Use and the Elucidation of Physiological Phenomena.

WEDNESDAY.—5 P.M. (at Bedford College, Regent's Park, N.W.), Prof. S. J. Cowell: Factors in Nutrition. (First of six lectures.)

THURSDAY.—5.30 P.M. (at University College, Gower-street, W.C.), Prof. C. H. Best: The Rôle of the Liver in the Metabolism of Carbohydrate and Fat. (First of three lectures.)

FRIDAY.—5 P.M. (at University College, Gower-street, W.C.), Mr. G. P. Wells: Comparative Physiology. (First of ten lectures.)

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, Jan. 8th, to SATURDAY, Jan. 13th.—WEST END HOSPITAL FOR NERVOUS DISEASES, In-patient Department, Gloucester-gate, N.W. Demonstration on the Fundus Oculi, by Mr. R. Lindsay Rea, on Tues. at 8.30 P.M. (Specially suitable for M.R.C.P. candidates.)

PANEL OF TEACHERS: Individual clinics in various branches of medicine and surgery are available daily by arrangement with the Fellowship of Medicine.

THE LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.

TUESDAY, Jan. 9th.—5 P.M., Sir E. Graham-Little: Cicatrical Alopecia.

THURSDAY.—5 P.M., Dr. W. J. O'Donovan: Stocking Erythroderma.

KING'S COLLEGE HOSPITAL MEDICAL SCHOOL.

THURSDAY, Jan. 11th.—4.30 P.M., Dr. R. T. Hewlett: Prevention of Diseases Conveyed by Food. 9 P.M., Mr. L. H. Savin: Squint and its Treatment.

ROYAL NORTHERN HOSPITAL, Holloway-road, N.

TUESDAY, Jan. 9th.—3.15 P.M., Dr. B. Schlesinger: Diseases of the New-born.

CENTRAL LONDON THROAT, NOSE AND EAR HOSPITAL, Gray's Inn-road, W.C.

FRIDAY, Jan. 12th.—4 P.M., Mr. H. Kisch: Frontal Sinusitis: Diagnosis and Treatment.

LEEDS GENERAL INFIRMARY.

TUESDAY, Jan. 9th.—4 P.M., Dr. MacAdam: Demonstration of Medical Cases

GLASGOW POST-GRADUATE LECTURES.

WEDNESDAY, Jan. 10th.—4.15 P.M. (at the Western Infirmary), Dr. G. A. Allan: Medical Cases.

NOTES, COMMENTS, AND ABSTRACTS

PSYCHO-ANALYSIS AND MODERN MEDICINE*

BY ERNEST JONES, M.D., M.R.C.P.

PRESIDENT OF THE INTERNATIONAL PSYCHO-ANALYTICAL ASSOCIATION; DIRECTOR OF THE LONDON CLINIC OF PSYCHO-ANALYSIS

THE word "modern" is introduced into the title of this address to indicate an important change that has come over medicine in the past 20 or 30 years. Nowadays stress is laid far more on the functional and dynamic aspects of disease than on the more static aspects of any "lesions" that may be concerned. One may describe this change as a closer approach to reality. The capacity for functioning—present and future—has become the practical issue of clinical medicine, the criterion by which disease is estimated: a heart or liver is bad if it is working badly or is likely to work badly. The advance made in clinical psychology is along a parallel line to this. Psycho-analysis, which is the essence of modern clinical psychology, lays stress on the active functioning of the personality for its criterion of the severity of any mental disorder. More than this, it conceives of such disorder in terms, not of lesions or labelled states, but of dynamic, striving impulses in the mind. Its psychopathology is cast throughout in dynamic terms, even to the problems of ætiology. Just as modern medicine goes beyond the static picture of lesions and seeks to understand the disturbance in organic function, so does psycho-analysis pass by the older mental categories of perception, cognition, &c., and seek to understand the dynamic processes of the mind—the motivation, purposes, and tendencies that produce a particular mental attitude or reaction.

I do not propose to give here any account of psycho-analysis, for many are now accessible.† My object is rather to comment on some aspects of the contact between it and general clinical medicine. We may consider three features here: the assistance psycho-analysis gives in dealing with a hitherto obscure field of clinical medicine; the light it throws on the interaction of mind and body in cases of organic disease; and the extent to which it is widening the field of medical practice.

Clinical Psychology

That one branch of medicine did not, until lately, share in the enormous advance general medicine had made in the past century is well known. I refer, of course, to psychological medicine, and particularly to the vast field of neurotic disorder. How large this is cannot easily be computed, but I have many times known experienced practitioners estimate the actual complaints and suffering for which they are consulted, irrespective of whether organic disease is present or not, as varying between 60 and 90 per cent.—at all events the large majority. Even if we say that the body is one half of the organic personality and the mind the other half, then it follows that general medicine—by studying physiology and pathology—offers the possibility of understanding one half, clinical psychology the other half. Those who reflect on this state of affairs, feeling their helplessness in the face of it, have naturally disliked their ignorance of what it all signifies and have automatically adopted some attitude to give them some ease of mind in the matter. One common attitude is simply to deny the significance of it, to depreciate in all possible ways the importance of mental suffering. How easy it is to overlook the profound loathing that lies behind an hysterical vomiting, the unendurable tension that can express itself only in a compulsive tic, the fear and hate behind ejaculatio præcox, or the murderous impulses masked by an agoraphobia. Such practitioners casually recommend a patient tortured with obsessions to play golf or to go for a sea cruise; more troublesome hysterical patients are immured in nursing-homes, where a hypothetical malnutrition of the brain—more imaginary than the actual trouble from which the patient is suffering—is remedied by the administration of milk and phosphates. When the futility of such methods becomes too evident then the practitioner is only too apt to fall back on moral disapprobation, and abusive words are spoken of the patient's laziness, obstinacy, and general moral turpitude—a mode of treatment not much more effective than the first one.

Over this vast field psycho-analysis offers the medical profession just what it lacks—both understanding of these disorders and the power of dealing with them. The trouble is that the profession is as yet only very imperfectly aware of its lack. Having acquired its own rough technique for avoiding psychotherapeutics it tends to resent being told that neurotic disorders can be both understood and cured, since this necessitates the taking of a deal of trouble. To accept this news puts a much greater responsibility on the practitioner than he used to feel when he could persuade himself that neuroses either did not exist or that the patient was only to be blamed for them.

MENTAL PAIN

In the symptomatology of somatic disorders pain occupies a peculiarly central position. When the danger signal of pain is present no one can be satisfied until he has ascertained the significance and cause of it. Now bodily pain can be masked in many ways, for the body automatically does what it can—by, for instance, inhibiting certain movements, &c.—to diminish any tendency to pain. And the same is true of the mind. Mental pain when acute is called unhappiness; perhaps a better word would be simply "dis-ease" in the original sense of this. When a patient is uneasy of mind we are faced with a problem. But the mind is far more ingenious than is the body in masking pain and thus assisting the practitioner's tendency to discount its central symptom of disorder. The importance of unhappiness runs parallel to the patient's strong motives for depreciating and diminishing it in any way possible. In its most acute forms, for instance, in the agony of agitated melancholia, it is of course not to be overlooked. But there are so many ways in which the practitioner can be misled, apart from his own proclivities in this direction, that most mental pain or disease is overlooked; one may unhesitatingly assert that it would be a gross exaggeration to say that even 5 per cent. of it gets appreciated at its true value.

All neurotic symptoms come about in the endeavour

* An Address delivered before the Paddington Medical Society.

† See, for instance, Helene Deutsch: Psycho-Analysis of the Neuroses, 1932. Freud: Introductory Lectures on Psycho-Analysis, 1929, and New Introductory Lectures on Psycho-Analysis, 1933. Ernest Jones: Papers on Psycho-Analysis, 3rd edition, 1923. Karin Stephen: Psycho-Analysis and Medicine, 1933.

to escape some underlying mental pain. One class is so effective as to be well known for this very feature. That is the remarkable phenomenon where mental disturbances are replaced by physical ones, the "conversion" or somatic form of hysteria; what the French call "la belle indifférence des hystériques" illustrates the success of the manœuvre. Even more astonishing are the cases where mental dis-ease is marked by its very contrary, by forced and excessive gaiety, by various deceptive forms of pseudo-happiness, and so on. It is a daily occurrence to hear of the last tragedy of all, suicide, happening when just before the victim gave the impression of being "in the best of spirits."

INSTINCTS AND CONFLICTS

Psycho-analysis finds the ultimate source of mental trouble—whether neurotic or psychotic—in a disorder of the instinctive life. And of all mental processes it is the instincts—the inborn endowment of the mind—that lie nearest to both the psychological and the biological way of thinking. If we try to picture the physical correlative of the instincts, which as psycho-somatic manifestations they must surely have, we would nowadays do so in terms of biochemistry, the characteristic feature of modern medicine, rather than in those of the static histological studies of the cortex so hopefully pursued 30 years ago. The more simple, and almost reflex, instincts, such as appetite for food, rarely get disordered in any primary fashion, though of course they are often secondarily involved in disorders arising elsewhere. The instincts that matter in the present connexion all concern our relations with other human beings. They may usefully be divided into two groups: those displaying a positive attitude towards our fellow-beings, such as sexual, social, and friendly impulses; and those displaying a negative one, such as aversion, fear, hate, disgust, flight, or quarrelsomeness. An interesting combination of the two is presented by the moral group: this displays both positive elements, such as honesty, loyalty, sense of duty, and so on, and also negative ones, notably the tendency to criticise adversely, to condemn, or even to persecute. In psychopathology the instincts of most concern are those of sexuality, hate, fear, and morality; but, since the last can probably be resolved into derivatives of the others, we are left with three of chief note.

Now it is interesting to observe that each of these instincts, whether positive or negative in kind, may manifest itself in one of two opposite ways, which may be called sthenic or asthenic respectively. The sthenic effects are bracing and stimulating; the asthenic effects enervating and debilitating. A man may, for example, be firm and determined with a cold, hard hatred, or he may be ineffectively trembling with anger. Similarly fear may make every muscle taut and ready, every sense alert, and the mind at its highest pitch of quick response to thought; on the other hand, it can notoriously paralyse every function. Whether the operation of an instinct leads to harmonious effectiveness or to disintegration appears to depend on one central factor, namely, on whether it is acting as an expression of the personality approved of by the self or, on the contrary, in opposition to important constituents of the personality. We call it ego-syntonic in the former case, ego-dystonic in the latter. It is of some theoretical interest, and also of some diagnostic value in practice, that prominent physiological accompaniments of emotion—sweating, trembling, tachycardia, and the like—occur mainly with ego-dystonic manifestations of instinct activity. From these simple considerations we begin to see the enormous importance of *mental conflict*, a conception which occupies a central position not only in psycho-analysis, but in all modern psychopathology. What this word connotes furnishes the key to the understanding of most problems of the psychoneuroses, of the psychoses, and even of normal psychology. Emotions, also depressing ones, may be stirred by other causes than conflict: strain, grief, anxiety, and so on. But distress does not itself constitute neurosis. On the other hand, with most cases of apparently simple distress closer examination will show that it is being intensified by some associated conflict. It is, of course, easier to ascribe mental trouble to simple and obvious factors, but it is seldom correct to do so. Thus none of the endless cases of "nervous breakdown due to overwork" is really brought about by this factor—it is invariably associated with some hidden source of conflict.

These intrapsychical conflicts, even those assuming an apparently current form, all originate during the early development of the mind. Certain internal antagonisms and incompatibilities then established have never since been resolved. In fact the method adopted for dealing with them excludes the possibility of solution, since it consists largely in accepting them as insoluble and merely building up a series of defences, insulating one part of the mind from the other, and so on. In this fashion it is hoped to keep at bay those instincts that appear to be antagonistic or dangerous to the ego. Such methods, in which *psychological repression* plays a large part, have a certain amount of success, but always at a cost which varies from one individual to another and in the same individual from one period of life to another. Something may be observed of the effects of these deep conflicts, particularly when they produce distressing neurotic or psychotic troubles, but the conflicts themselves are invisible to both the observer and the patient, since they take place in what nowadays is termed the *unconscious* region of the mind. The period when they are generated is always the first three or four years of life, after which the structure of the personality has been established for good or ill. Usually medical practitioners take note of a current situation, grief, disappointments, &c., or else fly to an explanation in heredity. The paramount importance of the intervening period of early development is commonly overlooked, and was so altogether until Freud directed attention to it. And yet that important events must take place in those early years should not be surprising when we remember that the individual child has in the first five years of life to accomplish the transition from the animal to civilised man, to achieve in that short time what has taken mankind anything from 50,000 to 500,000 years.

The essential content of the repressed impulses may be summed up in two words: incest and murder. When we reflect that these refer to loved parents, that bitter hostility has to fight against the strongest feelings of dependence and affection, it is not astonishing that no easy solution can be found. On the physical side also there are many bewildering ideas with which the young child has to grapple: the problems of cleanliness, clashing with the extraordinary significance that excretory processes have for the infant; the instinctive knowledge of coitus, with the unknown dangers accompanying the idea of penetration; the sex differences, with their implication of castration. Small wonder that no child escapes an "infantile neurosis," tantrums, fears, eating difficulties, destructiveness, &c., manifestations which every adult does his best to discount. If one describes the unconscious conflicts in this sphere of

repressed impulses as essentially taking place between love and hate, or between the sexual impulse and fear, one will cover a great deal of the ground by this brief generalisation.

The course of *symptom-formation* in psychopathology is of peculiar interest, being much more circuitous than one would expect. If the defences built up in infancy against the unconscious conflicts are effective enough then no manifest neurosis need exist, though some measure of inhibition is always to be found. The occasion for the onset of a clinical neurosis is most often some form of privation or thwarting. This is usually an external thwarting, though in one interesting circumstance—namely, when a person gives way at the height of success—it has an internal source (the forbiddenness of success). In any event the occurrence comes to have an internal meaning, to represent punishment, as if it were an internal forbidding due to guilt or fear. Misfortune is always taken in a moral sense; the person (or race) adopts an attitude of moral condemnation either towards himself or others. Then the latent unconscious conflict is reactivated: thwarting and forbidding versus the forbidden impulses. The latter "regress" to their original infantile form, and the unconscious builds an imaginary (hallucinatory) wish-fulfilment of them. The clinical symptoms represent—in a symbolic or masked way—the compromise between this primitive wish-fulfilment and the forbidding and repressing agencies of the mind.

I will not dwell longer on these rather complicated matters, but I wished to lay stress on the essential importance of infantile unconscious conflicts in relation to the problems of psychopathology, and to indicate that only by exposing them fully and finding some solution of them can one hope to bring about a radical cure of the distressing maladies they so often generate.

Psycho-analysis and Bodily Disease

The second way in which psycho-analysis has an important bearing on medical practice is in relation to bodily disease. It must be rare for bodily disease to last long without its becoming complicated by some form of neurosis, and the question arises of the precise relation between the two conditions. Bodily disease would seem to have three main effects on the mind, and each of them may in turn set up a complex train of reactions.

Deprivation.—In so far as bodily disease produces manifestations that the patient can perceive, whether active symptoms or merely restriction of strength, movement, &c., it imposes limits on his previous freedom and well-being. This deprivation may then serve as a starting-point of a neurotic development in the way I indicated previously when speaking of privation in general. It is accepted by the unconscious mind as a punishment for guilty impulses, an attitude which may become conscious among unsophisticated people, as when they offer sacrifices and make atonements during an epidemic to avert the wrate of God at their sins. Compensatory phantasies are stirred in the unconscious, the purport of which is to deny the guilt or defy the punishment. These reverberate into the deepest layers of primary conflict, and the neurotic symptoms resulting therefrom are attempts to express a compromise between the two sides of the conflict. Perhaps the commonest clinical result is where the physical symptom is directly "exaggerated," i.e., intensified by the addition of neurotic suffering. Pain is commonly so intensified, a fact which often gives rise to practical difficulties in estimating its clinical significance. A rheumatic arm may develop an hysterical anæsthesia or paresis, and there is the whole gamut of conversion phenomens to choose from.

Fear.—It is not possible for any affliction of the body to occur without its stirring some degree of fear in the unconscious, and often enough a certain amount of it penetrates through to consciousness. Even the very thought of such affliction, without its being actually present, is often enough to stir fear, as witness the extensive series of pathophobias (among which dread of syphilis and cancer are assuredly the most frequent). The very word "heal" means to make "whole"—i.e., to restore the threatened integrity of a unity and prevent the loss of any part. Psycho-analysis has thrown much light on the nature of this fear. The unconscious apprehends any affliction of the body, notably accidents and surgical operations, but also simple diseases, as assaults the ultimate aim of which is mutilation. And the essence of the mutilation is damage to an erotic organ, most typically castration or destruction of the womb. These irrational fears are again connected with infantile guilt, and so go to reinforce the factor of deprivation I mentioned earlier.

Opportunity for suffering.—Suffering plays a very remarkable and complex part in the human economy, and it has been the subject of extensive psycho-analytic research. In spite of the natural and powerful revulsion of the mind against any suffering, a revulsion which has led to the elaborating of many forms of defence, nevertheless certain agencies in the mind have not failed to exploit certain forms of suffering—probably as a protection against others. It may, for example, be made to minister to the deep need for self-punishment which is so much more prevalent than is recognised. The tendency to self-punishment, which may express itself physically by avoidable accidents, &c., or—more often—in the various subtle ways of self-thwarting in life, has as its purpose the allaying or neutralising of the unconscious sense of guilt, one of the most intolerable forms of suffering. Then, again, the painful sting of punishment, misfortune, and suffering is often dealt with by "libidinising" the act or process in question, i.e., by investing it with erotic feeling. One form of this is familiar as the sexual perversion of masochism, where suffering, pain, or humiliation is sought, not for its own sake, but for the sake of the accompanying erotic gratification. Every surgeon, whether he recognises them or not, must encounter many cases where the patient is secretly bent on having some operation or other under various more or less plausible pretexts, and it may happen that the situation happily coincides with some repressed trend of sadism in his own nature.

The Enlarged Scope of Medicine

The third respect in which psycho-analysis bears on medical practice is the vast extension it gives to the field of practice. So much is this so that a considerable proportion of patients who apply for analysis would never have regarded their problem as coming within the ordinary medical purview. It is becoming plainer that many difficulties in life that would previously have been called social or moral problems, or thought to be due to unalterable individual peculiarities, are really in great part the product of mental complexities that fairly come into the field of psychopathology. Moreover, they can be beneficially treated by regarding them from this point of view.

The reason for this is that if a neurosis or psychosis is left to run its own course it tends to evolve through a stage of clinical symptoms and personal suffering—where also it would be recognised as in some sense "medical"—then through a further stage of anti-

social attitudes or behaviour (hatred and aversion), and to culminate in some form of pure inhibition. Inhibition is the ultimate goal; but the neurosis traverses various more or less stormy stages before reaching it. Symptoms signify unhappiness: inhibition signifies the renunciation of happiness—and of all the efficiency that goes with it.

The social difficulties I have been referring to concern these later stages of the neurosis. Perhaps the commonest example of them is marital unhappiness. In certain phases this may reveal itself in gross "medical" manifestations, notably impotence or anæsthesia, though even here one may remark that there are so many forms and degrees of these that they are often overlooked clinically, and further that medical practitioners commonly under-estimate both the frequency and the significance of such troubles. More often, however, sexual difficulties fall into the background of the picture, and the dissatisfaction works itself out as envy and bickering over petty matters, most often in regard to money. Regressions to infantile patterns are exceedingly common in married life; indeed in some degree they occur in the vast majority. The mate becomes unconsciously identified with the corresponding parent, and the imperfectly solved ambivalence towards that parent—with its buried hostility, anxiety, and dependence—is transferred to the mate. I am touching here on a very large theme, but what I wanted to make plain is that a large amount of so-called marital incompatibility, with its destructive effect on happiness and social efficiency, is really of psychopathological origin, and that this knowledge opens an extensive new field of work to the medical profession.

There are many other new fields of which the same may be said. Difficulties, inefficiencies, or even pronounced inhibition are very common in daily work, with the most serious personal and social effects. Difficulties in "getting on" with one's fellows, perhaps especially with superiors, perhaps especially in public, or perhaps in general social life, are also exceedingly common. Sexual perversions, a subject on which there is no teaching given in our medical schools, and the very names of which are often unknown to medical practitioners, are to be found both in a manifest form and, much more often, in disguised forms that produce other manifestations such as alcoholism, drug addiction, eccentricity, &c.

I have mentioned a few of the new fields which have become more accessible to medical work since psycho-analysis has deepened our understanding of them and pointed the way to therapeutic help. It does not require any special far-sightedness to look forward to the time when, as a result of these extensions, the medical profession, particularly the medical psychologist, will play a far more important part than now in the body politic. Even the field of legislation, and of international relationships, is one where our knowledge and advice will come to be of very considerable assistance. But one must confess that at present the medical profession appears to be signally unaware of the perspective opening out before its eyes, as well as unresponsive to the vast opportunities now presented to it.

PHYSICAL MEDICINE IN GYNÆCOLOGICAL CONDITIONS.—In a discussion (THE LANCET, Dec. 30th, 1933, p. 1481) Dr. Philip Ellman used the word "courses" where "applications" is reported, and the end of the next sentence should read: "the 'degenerative' type of arthritis was not infrequently characterised by the presence of Heberden's nodes."

BLOOD TESTS AND PATERNITY

ALTHOUGH not yet fully recognised by the English law-courts, the value of blood-grouping in the establishment of non-paternity is widely accepted on the continent and in America. As a general rule it may be stated that a man whose blood does not contain agglutinogens A or B cannot be the father of a child in whose blood they are found. The newer knowledge of the M and N agglutinogens discovered by K. Landsteiner and P. Levine is now helping to narrow the field yet further. The hereditary transmission of these two agglutinogens is now established as depending upon a single pair of allelomorphic genes M and N. Three genotypes MM, NN, and MN are possible, corresponding to the three phenotypes M+N− (M present, N absent), M+N+ (M and N both present), and M−N+ (M absent, N present). The hereditary transmission of the M and N agglutinogens may be set out thus:—

Type of mating.	Offspring possible.
M+N+ × M+N+	M+N+, M+N−, M−N+
M+N+ × M−N+	M+N+, M−N+
M+N+ × M+N−	M+N+, M+N−
M+N− × M−N+	M+N+
M+N− × M+N−	M+N−
M−N+ × M−N+	M−N+

Alexander S. Wiener [1] reports two cases illustrating the uses of these agglutinogens in the determination of paternity. In the first the question arose whether the husband or a lover were the father of a child. The husband, being an American, was willing to support the child regardless of paternity; but his wife, being also an American, insisted that she would live only with the child's true father. Both men belonged to Group A, a fact which threw no light on the matter; but on reference to the M and N agglutinogens the following distribution was found: husband, M+N−; lover, M−N+; child, M+N−; mother, M+N−. This made it clear that the lover could not be the father of the child. The wife nevertheless elected to go off with him.

The second case related to a wife who after eight years of sterile married life took a lover and shortly afterwards became pregnant. Three years later a second child was born, and this time the husband discovered the existence of his rival. When his wife expressed a desire to leave him he threatened to take the case to the courts, on doing which he would certainly have got custody of the children. The wife felt the lover to be the father of the children and had recourse to blood tests. The classical groups in this case gave some help. The husband proved to be of Group O, the lover of Group A, the wife of Group O, and the children of Groups O and A—a fact which made it obvious that the husband could not be the father of the second child, but threw no light on the paternity of the first. The distribution of the M and N agglutinogens was as follows: husband, M+N+; lover, M−N+; mother, M+N+; children, M+N− and M−N+. This showed, somewhat surprisingly, that the lover could not be the father of the first child. The outcome of this situation is not related.

RESULTS IN THE TREATMENT OF CANCER

IN 1922 a follow-up department was formed at St. Bartholomew's Hospital, and Mr. R. W. Raven, the medical officer in charge of it, has used the information now accumulated to study the results of treatment for cancer of the breast and of the buccal cavity.[2] The value of the data is enhanced by the fact that the number of patients lost sight of is negligibly small; for instance, out of 894 cases of primary spheroidal-celled carcinoma of the breast only two are reported lost. For comparative purposes the survival-rate is utilised, defined as the percentage of patients treated that are alive after a given interval of time, after excluding those dead of causes other than cancer and those lost sight of. The total exclusion of these two groups, which have been

[1] Amer. Jour. Med. Sci., 1933, clxxxvi., 257.
[2] St. Bart's Hosp. Rep., 1933, lxvi.

exposed to risk of dying from cancer for some period of time, and have not in that time succumbed to it, must somewhat magnify the mortality-rates, but as both of them are small the error is not material.

A study of the survival rates in carcinoma of the breast shows how important in prognosis is the involvement or otherwise of the regional lymph nodes. The proportion surviving operation five years is twice as high among those with no involvement. Comparison of the several methods of treatment—surgical operation alone, surgical operation plus X rays, and interstitial irradiation—is difficult, not only because of the problems of allocation of different types of patients to the different groups, but also because in several of the groups the numbers are very small. For instance, a three-year survival-rate of 34·5 per cent. is shown by patients with the axillary lymph glands involved treated by "complete operation" (excision of the breast and axillary lymphatic glands together with the pectoralis major and pectoralis minor muscles, and the infraclavicular lymphatic glands). Patients of similar type in whom the complete operation was followed by deep X ray therapy had a three-year survival-rate of 43·7. Comparing these rates Mr. Raven suggests that "a marked improvement is evident"; but as the latter rate is apparently based upon only 16 patients it is difficult to subscribe to this, or to do more than concur in his demand for further investigation. The two groups submitted to the complete operation and to interstitial irradiation are large enough for a more satisfactory comparison, and show three-year survival rates of approximately equal value (about 60 and 30 per cent. without and with glands involved respectively). This result probably undervalues radium treatment, since Mr. Raven reports that patients treated with it were often more advanced in disease than those operated upon.

In the report on treatment of cancer of the buccal cavity 374 cases are dealt with and many clinical case records are included. Subdivision of the cases by site, method of treatment, and year of first observation produces many small groups, and it is sometimes difficult to see the wood for the trees. But here Mr. Raven's object is not to study "massed figures," but to illustrate the "individual aspect of the subject," and from this mode of study he concludes that both surgery and irradiation have an important place in the treatment of cancer of the tongue. Without more precise statistical evidence it is, however, difficult to accept some of his conclusions, e.g., that the virulence of cancer of the tongue is greater in young patients or that it has a definite predilection for certain classes of people. Division of a series of patients into occupational classes is not helpful without knowledge of the size and age-distribution of the total population exposed to risk in each class. Much interesting information is given on such points as the type of growth, the initial lesions, metastases, and the terminal condition of the patient. A final point of comment is that Mr. Raven would materially assist his readers in their judgments if wherever percentage survival-rates were given there was also set out the absolute number of cases upon which they are based. This information can be acquired from the more detailed tables but only with labour, and sometimes also with doubt, since the figures in the tables and the text do not always seem to agree.

PLANTS AND HUMAN WELFARE

THE head of the department of botany in University College, Hull, has put together into a small compass a surprisingly inclusive account of the relationships of plants to human welfare.[1] The first five chapters and the last are readable essays on plant physiology, agriculture, and economics; the rest is a catalogue—cereals, vegetables, fruits, sugar, oils, spices, drugs, rubber, coal, petroleum, &c.—and if there was a better index it would form a useful small book of reference for facts which are not always easy to come by. As it is, the only way of checking the cook's statement that semolina was strange stuff which came from the island of Semouli is to read the book through as far as p. 61 (or to know the right answer which some of us do not). From the preface it appears that the book is educational and examinational in aim; the catalogue can serve only the worst types of examination, and we cannot help thinking that Mr. Good's purpose would have been better served if he had dealt with fewer facts and devoted more space to such topics as the revolution caused by the introduction of winter greens and turnips into English agriculture in the seventeenth century, the instinct with which scorbutic sailors snatched at a cruciferous plant, and the rolation of wheat cultivation to climate and soil. His more general chapters show that he could do this in a very interesting way, and one which we believe would be of more advantage to his pupils; his short account of the spice trade (p. 103) is just what is wanted, though he omits the significance of incense and the influence of soap and personal cleanliness. However, we can heartily commend the book to anyone who wants to know where their food and clothes and paper come from.

[1] Plants and Human Economics. By Ronald Good, M.A. London: Cambridge University Press. 1933. Pp. 202. 5s.

THE NATIONAL TEMPERANCE LEAGUE

A LEADING article which appeared in THE LANCET during the week when America was celebrating the demise of prohibition, has led to the following statement being sent to us for publication by the National Temperance League:—

MEDICAL CONDEMNATION OF THE BREWERS' ATTACK UPON YOUTH

"We the undersigned view with serious apprehension the projected campaign which would seek to enlist the young men of the country who do not know the taste of beer into the beer drinking habit.

"As a result of several causes and tendencies there has been a vast improvement in national sobriety in recent years. There has also been a corresponding diminution in the disease, poverty, crime and inefficiency which are traceable to drink.

"The beverage use of alcohol is not really necessary to the highest exercise of individual and social life. We therefore deprecate the initiation of an effort to promote the beer drinking habit among the young, and we would regard the success of such a campaign as a step backwards and as detrimental to the best interests of individual and national welfare."

To this statement the names of over 250 medical men are appended, representative in unmistakable manner of the different branches of medicine and of the sciences in close association with medicine. The protest of the signatories against the attitude which led Sir Edgar Sanders to advocate the initiation of millions of young men into the beer drinking habit is moderately worded, and should lead those who have agreed with his singular propaganda to revise their view.

THE HEADACHE OF LUMBAR PUNCTURE

"*M. D. J.*" writes: "A few days ago, being invalided on account of debility, rheumatism, and colonic pain, I had a lumbar puncture done, two cubic centimetres of clear fluid being withdrawn. The puncture was practically painless and the fluid showed no significant changes, but some hours after the puncture I had an awful aching in the head, or so it seemed to me who had never suffered from headache. The only relief I could obtain was by hanging my head over the side of the bed, by going on all fours, or with my head between the knees. While doing this it crossed my mind (1) that the inability of performing dogs or horses to stand for long on their hind legs may be due to the effect of gravity on the cerebro-spinal fluid; (2) that the Mohammedan attitude of prayer may have had its origin in some instinct of physical relief. It was several days before I could sit up without pain in the head. How long

should it take for this quantity of cerebro-spinal fluid to be replaced?"

The headache after lumbar puncture by the syringe is not the result of withdrawal from the lumbar sac of a small quantity of fluid, but is due to the continual drainage of fluid that goes on later from the opening n the dura mater, especially when the patient is erect. The headache may therefore occur at any time, irrespective of the amount of fluid withdrawn. Relief is gained by keeping the head low, and after lumbar puncture the patient should always be kept, for at any rate several hours, horizontal, or with his head at a lower level than the rest of his body. A small quantity of cerebro-spinal fluid is of course rapidly replaced, but the replacement cannot keep pace with the loss of fluid through the opening in the dura if the patient remains erect. The suggestion about performing animals should interest the veterinarian.

KING'S COLLEGE HOSPITAL IN THE ANTIPODES.—Readers of the *Medical Journal of Australia* for Oct. 28th, 1933, will be surprised to find it a "King's College Hospital number" containing nine papers by members of the staff of this London hospital. At the suggestion of an Australian visitor, Dr. R. Graham Brown of Brisbane, Mr. V. E. Negus agreed to collect a series of articles from his colleagues, and the contributors, besides himself, are Mr. Myles Bickerton, Mr. E. B. Clayton, Dr. Terence East, Mr. John Everidge, Mr. William Gilliatt, Mr. J. B. Hunter, Dr. R. D. Lawrence, and Dr. Wilfrid Sheldon. Their contributions are worthy of the project, and, as the editor remarks, they are also an expression of goodwill to the journal and to the practitioners of Australia. "They will surely," he says, "cement the ties that bind Australian to English medicine."

"ELASTOPLAST TECHNIQUE."—The various uses of Elastoplast bandages and dressings are described and illustrated in this small book issued by the manufacturers, Messrs. T. J. Smith and Nephew, Ltd., of Hull. Under headings arranged in alphabetical order will be found methods of applying such bandages in a large number of conditions encountered in medical and surgical practice. Extracts from articles in the medical press and from the reports of practitioners are given in support of the procedures advocated or in explanation of their value. The whole provides impressive evidence of the wide usefulness of adhesive bandages, and the diagrams show exactly what is to be done to get the best results from them. Without committing ourselves to agreement with all the suggested indications, we recommend the book to everyone who may wish to apply such methods. It is issued to medical practitioners only, and may be had by them for the asking.

A HISTORICAL CALENDAR.—Warner's Calendar of Medical History has a page for every day of the year, and most of them are enlivened by a brief biography and portrait, a quotation, or a scrap of historical information. On occasional pages are gathered groups of useful facts on subjects like the times of dentition, the classification of baths according to temperature, and the calcium content of foods. At the end are some 50 pages setting out, for example, the symptoms and treatment of food poisoning, the characteristics of infectious diseases, the incompatibilities of drugs, the functions of endocrine organs, the chief sources of vitamins and mineral salts, and the normal rates of development in childhood. The book is well printed (in Philadelphia) on good paper, and Messrs. William R. Warner and Co., Ltd. (300, Gray's Inn-road, London, W.C.1), have devoted remarkably little of it to description of their own products.

HEXAMINE AND BACILLURIA.—"A Sufferer" writes: Instead of taking hexamine three times a day, I find it best to take it, in smaller doses, every four hours—at night as well. That portion (half) of the hexamine which is not destroyed in the stomach is excreted in the urine unchanged within four hours, and if the object is to have hexamine constantly in the bladder one must take it frequently. It should never be given after meals, but should be administered in water half an hour before them.

Messrs. Schering, Limited, have removed their offices and warehouse to 188–192, High Holborn, London, W.C.1.

Vacancies

For further information refer to the advertisement columns

Barry Surgical Hospital.—H.S. At rate of £200.
Birmingham, Queen's Hospital.—Registrar to Ear, Nose, and Throat Dept. £150.
Bradford, Royal Eye and Ear Hospital.—Jun. H.S. £150.
Bristol Eye Hospital.—Asst. Res. H.S. At rate of £100.
Central London Ophthalmic Hospital, Judd-street, W.C.—Sen. and Jun. H.S.'s. £120 and £100 respectively.
Central London Throat, Nose and Ear Hospital, Gray's Inn-road, W.C.—First Asst. in Out-patient Dept.
Chester Royal Infirmary.—H.S. £150.
Colchester, Essex County Hospital.—H.P. £150.
Coventry, Coventry and Warwickshire Hospital.—H.S. for Aural and Ophth. Depts. At rate of £125.
Devon County Council.—Deputy County M.O. £720.
Edenbridge District Hospital, Kent.—Hon. Consulting Physician.
Enfield Urban District Council.—Part-time Asst. M.O. £300.
Erith and District Hospital.—Hon. Consulting Radiologist.
Greenwich, Seamen's Hospital Society.—H.S. for Tilbury Hospital. At rate of £140.
Guildford, Royal Surrey County Hospital.—H.S. £150.
Halifax, St. Luke's Hospital.—Jun. Res. M.O. £250.
Harrogate, Royal Bath Hospital.—Res. M.O. At rate of £156.
Hull Royal Infirmary.—H.S. to Sutton Branch Hospital. At rate of £160.
Liverpool, David Lewis Northern Hospital.—Four H.S.'s, Two H.P.'s. Each at rate of £80. Cas. O. at rate of £120. Also Reg. to Orthopædic Dept.
Manchester, Ancoats Hospital.—H.P. At rate of £100.
Manchester, St. Mary's Hospitals.—Res. Obstet. O. £175. Also Two H.S.'s. Each at rate of £50.
Medical Woman for London Missionary Society, Livingstone House, Broadway, S.W.
Metropolitan Hospital, Kingsland-road, N.—Cas. O. At rate of £100.
Middlesex County Council.—Asst. Dental Officer. £500.
Middlesex Hospital, W.—Physician to the Children's Dept.
National Temperance Hospital, Hampstead-road, N.W.—Officer for X Ray Dept.
Mount Vernon Hospital, Northwood.—H.S. At rate of £150.
Newcastle-upon-Tyne Hospital for Sick Children.—H.P. and H.S. Each at rate of £100.
Northampton General Hospital.—H.S. At rate of £150.
Nottingham and Midland Eye Infirmary.—Res. H.S. £200.
Nottingham City Infirmary.—Asst. M.O. £350.
Nottingham, Harlow Wood Orthopædic Hospital.—Two H.S.'s. Each at rate of £175.
Oxford, Wingfield Morris Orthopædic Hospital, Headington.—H.S. £100.
Plaistow Fever Hospital.—Sen. Res. M.O. £350.
Plymouth, South Devon and East Cornwall Hospital.—Res. Anæsthetist and H.S. to Spec. Depts. At rate of £120.
Poole, Dorset, Cornelia and East Dorset Hospital.—Hon. Surgeon.
Poplar Hospital for Accidents, East India Dock-road, E.—Second Res. O. £175.
Preston and County of Lancaster Royal Infirmary.—Cas. O. At rate of £150.
Queen's Hospital for Children, Hackney-road, E.—Temporary Asst. Surgeon.
Rhondda U.D.C.—Asst. M.O. £500.
St. Helens Hospital, Lancs.—Sen. H.S. £200.
St. John's Hospital, Lewisham, S.E.—Res. H.S., Res. Cas. O., and Res. H.P. Each at rate of £100.
St. Mary Abbot's Hospital, Marloes-road, Kensington, W.—Asst. M.O. £350.
St. Mark's Hospital for Cancer &c., City-road, E.C.—Anæsthetist. £25.
Sheffield, Children's Hospital.—Res. M.O. £175. Also H.P. At rate of £100.
Sheffield, Jessop Hospital for Women.—H.S. At rate of £100.
Sheffield Royal Infirmary.—Ophth. H.S., Asst. Aural and Ophth. H.S., and H.P. to Dermatologist. Each at rate of £80.
Southampton, Royal South Hants and Southampton Hospital.—Sen. H.S. £200.
South London Hospital for Women, Clapham Common, S.W.—Surg. Reg. 50 guineas. Out-patient M.O. £100.
South Shields, Ingham Infirmary.—Jun. H.S. £150.
Stoke Newington Dispensary, High-street, N.—Res. M.O. £200.
Sunderland Royal Infirmary.—Asst. Pathologist. £350.
Taunton, Somerset and Bath Mental Hospital, Catford.—Sen. Asst. M.O. £400.
Victoria Hospital for Children, Tite-street, Chelsea, S.W.—Hon. Surg. Reg. Also H.P. and H.S. Each at rate of £100.
Western Ophthalmic Hospital, 155, Marylebone-road, N.W.—Sen. and Jun. Res. H.S.'s. At rate of £150 and £100 respectively.
West London Hospital, Hammersmith, W.—Res. Anæsthetist. At rate of £100.
West Riding of Yorkshire, Menston Mental Hospital, near Leeds. Fifth Asst. M.O. £350.
Wolverhampton Royal Hospital.—H.S. At rate of £100.

The Chief Inspector of Factories announces a vacant appointment for a Certifying Factory Surgeon at Falkirk, Stirling.